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Report on Diseases of Farm Livestock

SECTION III: PARASITIC DISEASES OF BOVINES*

HELMINTHIASES

There are three economically important diseases of cattle —and particularly young cattle—caused by parasitic worms: Parasitic Gastro-enteritis, Parasitic Bronchitis and Fascioliasis. Of these, parasitic gastro-enteritis is the most widespread and is of the greatest general importance.

Parasitic Gastro-Enteritis

CAUSAL PARASITES

This disease is caused by heavy infestation of the abomasum or of the anterior part of the small intestine, or both, by one or more species of a group of small nematode worms belonging to the sub-family, *Trichostrongylinae*. The nature of the disease differs only slightly with the species of parasite concerned so that the various specific infestations may very properly be dealt with as one disease.

The species that occur in the abomasum are the most pathogenic and of these the most important ones are *Haemonchus contortus*, which is the largest of the group, ranging up to one and one-quarter inches in length and about the thickness of an ordinary pin of that length; the other worms are smaller and much finer—*Ostertagia ostertagi*, up to almost half an inch in length; *Trichostrongylus axei* only about one-sixth of an inch in length; *Cooperia oncophera*, found only in the small intestine and measuring up to one-third of an inch; and *Nematodirus filicollis*, also found only in the small intestine, and measuring up to three-quarters of an inch in length. In general, the trichostrongylid worms in the small intestine are less pathogenic than those in the stomach.

The precise pathogenic action of these parasites is difficult to understand as the presence of even a heavy infestation is rarely accompanied by lesions of disease. *Haemonchus contortus* is a voracious blood sucker and causes an anaemia similar to that which may be produced by extensive daily bleedings from the jugular vein. But the other two species do not suck blood nor, except on rare occasions, do they cause any serious local inflammatory reaction, although at times the mucous membrane of the abomasum and the small intestine may be sufficiently inflamed to suggest some kind of an irritant action. It has been postulated that the pathogenic action of the parasites is in some obscure way connected with their production of an injurious toxic substance, or that they possibly give rise to anti-enzymes that interfere with the digestive processes of the host's intestine.

Ostertagia ostertagi produces small nodules in the mucous membrane of the abomasum, particularly towards the pyloric end where the larva spends the fourth stage of its development before returning to the lumen of the stomach. In cattle, this species appears to take the place occupied by *O. circumcincta* in the sheep, in that *O. ostertagi* occurs in the largest numbers and is most pathogenic in cattle, whereas *O. circumcincta* occurs in the larger numbers and is the pathogenic member of the genus in sheep, the alternative infestations in both hosts being relatively slight and mild.

SYMPTOMS

The most constant symptom of parasitic gastro-enteritis is a progressive loss of condition; this symptom is, however, often overlooked when the disease occurs at a time of year at which the animals are subsisting on a poor diet, incapable of maintaining the body weight. In the more severely affected animals, the loss of condition frequently proceeds to the point of emaciation, but before this stage is reached, the bloom will have gone off the coat and the skin will have lost its elasticity. Diarrhoea generally becomes a noticeable symptom but is not invariably present. The animal usually continues to feed until a very late stage in the disease when weakness has become marked so that when the animal is driven it may stumble and fall, and for a time be unable to rise. The visible mucous membranes may appear anaemic and in severe *Haemonchus* infestations this symptom may be pronounced. Exceptionally in severe infestations occurring suddenly death may supervene before there is any marked loss of flesh.

Since increased infestation of the stock can only come about through the grazing of infected pasture, and cattle are generally grazed in herds, it is usual for symptoms to develop in several members of the herd at about the same time. The occurrence of individual cases of parasitic gastro-enteritis among a group of healthy young cattle is rare. Calves are the most susceptible, yearling cattle next; two-year-old cattle are still liable to develop the disease, but healthy adult cattle are resistant and only develop the disease in circumstances of considerable nutritional stress, any other strain associated with pregnancy or lactation, or a very high rate of infestation.

Some veterinary practitioners maintain that sub-clinical parasitism in adult cattle is widespread. They report a rise in the milk yield and a noticeable improvement in the condition of adult animals in apparently normal health following the administration of phenothiazine.

POST-MORTEM APPEARANCES

At *post-mortem* examination, emaciation, especially when accompanied by evidence that the animal had suffered from diarrhoea, should immediately arouse a strong suspicion of parasitic gastro-enteritis. In many cases the abdominal fat has disappeared or is very scanty; but when the animal has died from a recently acquired severe infestation, particularly with *Haemonchus contortus*, a considerable accumulation of abdominal fat may still be found. In *Haemonchus* infestation, the mucous membrane of the abomasum may be inflamed, and a considerable quantity of blood is sometimes found in that organ; small ulcers and punctiform haemorrhages may be present in the mucous membrane of the abomasum which is sometimes covered with a thick mucus. With the other species of parasites the inflammatory changes in the abomasum are less evident and are usually absent altogether. The intestine does not show

* In view of the paper shortage, which precludes the possibility of issuing a Handbook under present conditions, also because of the importance of the information it contains being made available to practitioners at this time of the year, Section III of the Report on Diseases of Farm Livestock, prepared by the Survey Committee of the National Veterinary Medical Association, is being published in this and successive issues of *The Veterinary Record*. This section will be issued as one of the series of N.V.M.A. Publications when paper for this purpose becomes available.

any definite lesions. The other organs are generally paler in colour than normal and the blood frequently appears thin and watery.

EPIDEMIOLOGY

The epidemiology presents several characteristic features dependent upon the life history of the parasitic worm. In their essential points, these life histories are the same for all of the species concerned. The eggs, which are laid in large numbers by the adult worms, are all passed on to the ground with the faeces of the infected animal. There they give rise to larval forms which, under optimum conditions, are able to reach a state of readiness for parasitic life within four or five days; they then leave the faeces in which their early development has taken place and migrate into the herbage where they await the grazing host.

Nearly all cattle harbour some of the parasites that are responsible for parasitic gastro-enteritis. Although all of the species that occur in cattle may be present in a diseased animal, one or other of the three principal abomasal species is usually present in outstanding numbers and is the obvious cause of the disease. The health of the animal is not obviously affected until a relatively heavy infestation has occurred. Factors favouring the successful growth of larvae on the pastures are, therefore, of importance as also are those favourable to the acquisition of larvae by the grazing animal.

The three main requisites for larval development on the pasture are moisture, warmth and oxygen; moisture is essential for the development of larvae and for their long life on the pasture and, providing the temperature is suitable, humid weather conditions and longer herbage favour larval development, whereas drought and short herbage are unsuitable. The benefits of short sparse herbage may, however, be largely offset as the inadequate pasturage not only compels the cattle to graze over a greater area, but necessitates closer grazing and favours the picking-up of those infective larvae that may still be sheltered in the lower parts of the herbage. In this way, cattle may acquire a heavier infestation when grazing short herbage in dry pastures than when grazing long herbage in damp pastures, although under the latter conditions a much larger number of larvae may be developing. Furthermore, when the herbage is sparse, it may be insufficient to meet the nutritional requirements of the grazing animals, which further predisposes the animals to parasitic worm infestation.

The oxygen requirements of the larvae are of less obvious practical importance. Eggs fail to hatch and larvae fail to develop in the centre of manure heaps because of the lack of oxygen as they also do in the inner parts of the average 'pat' of faeces deposited by a bovine animal. In general, the faeces of sheep serve as a better culture medium for the larvae of these worms than do the faeces of cattle, a point which may have some significance in mixed grazing. *Haemonchus contortus* and *Trichostrongylus axei*, at least, are readily transmissible from sheep to cattle and it is not unlikely that there is a disadvantage in grazing sheep along with cattle in that it may bring about a heavier infestation of the pastures than would result from the same extent of grazing by cattle alone. Grazing with cattle alone is, however, quite sufficient to build up a disease-producing infestation wherever the cattle are crowded together and left on any area of ground for a long enough time. This factor of overcrowding is one of the most important in influencing the development of an outbreak of the disease: theoretically, the rate of infestation increases directly as the square of the number of animals to the unit area is increased, and prolonged grazing on a relatively restricted area is always a dangerous practice. The small paddocks so frequently used for the grazing of calves near to the buildings are particularly dangerous in this respect and should always be regarded with suspicion.

Infection in Hay.—Infection in hay is of little consequence as most of the larval worms are destroyed in the hay-making process, either by the dryness of the air, or exposure to strong sunlight in the hay field, or through heating in the stack. A few larvae may survive but it is a very small percentage of the whole and is of little importance in disease production.

Duration of Infection on Pastures.—The veterinarian is frequently consulted by the farmer concerning the length of life of the larvae in the pasture herbage, and the minimum interval after which it may be safe to readmit cattle to a pasture known to have been heavily contaminated. Although infected larvae are able to survive for upwards of twelve months in pasture herbage, it is only those few that happen to be situated in a permanently moist and protected environment, deep in the grass tufts or between the leaf sheath and the shoot of the grass, that are able to survive so long. The remainder of the larvae have much shorter lives; those on the most exposed parts of the herbage do not survive for more than a few days. Since the introduction of cattle to clean pastures invariably results in the contamination of the pasture, it would be unreasonable to wait for the total disappearance of infective larvae before restocking a pasture. After even heavy contamination, it is therefore only necessary to allow the ground a rest sufficient to ensure the reduction of the larvae concentration to normal proportions. A period of about six weeks may often be sufficient for this purpose but where the herbage is long, and in damp, cloudy weather, a rest of five or six months may be required before a heavily infected pasture is again safe for susceptible animals.

Effect of Cultivation.—In general, the ploughing of old pasture and bringing of land into cultivation helps towards the control of parasitic worms but there may be a special danger associated with the cultivation of old pasture immediately followed by heavy reseeding and grazing. The probabilities are that the pre-infective and infective larvae thrive particularly well in ploughed land and make their way on to the new crop in considerable numbers wherever the preceding permanent pasture has been heavily infected. The destruction of larvae is assisted by chain harrowing in dry weather before ploughing and it is recommended that this should be done.

Immunity.—A most important point concerning the epidemiology of this disease is the relative susceptibility of young animals and the development of immunity as maturity approaches. To what extent this is dependent upon previous infestation, or upon age, is not precisely known, but both of these factors apparently operate towards the development of a resistance that begins in early life, perhaps at the age of four to six months, and slowly develops until 18 months or two years, when it may be regarded as having reached its maximum. This resistance or immunity is, however, far from absolute and may be broken down as a result of inadequate or deficient nutrition when the pasture herbage is very poor when store cattle are maintained on a too-meagre diet or in the event of a sudden massive infestation. The autumn is the most dangerous time, the pastures then being most heavily infected as a result of the summer's grazing; the herbage is also at its worst so that a strain is put on the calves' resistance from two angles. If at this time of the year heavily infected store animals are brought into the buildings and maintained, as stores frequently are, on a diet bordering on starvation, they fail to throw off the infection which they have brought with them and their condition gradually deteriorates. In these circumstances a state of chronic parasitic gastro-enteritis may be maintained for some

months although under the housed, winter conditions the animals are kept away from major sources of reinfestation. This manifestation of the disease is perhaps the most chronic of all and reaches its peak in the spring when the added strain of adaptation to a new diet of green grass may precipitate a crisis that terminates in death. This type of the disease could be entirely prevented by anthelmintic treatment in the autumn and a more liberal allowance of food at that time when the establishment of the animal's resistance to worms is in the balance.

Diagnosis

The diagnosis of the disease depends, firstly upon the appearance of the symptoms in several members of a group of young cattle; secondly, upon the history of the outbreak which will involve the points already discussed in connection with epidemiology, and thirdly, upon the confirmatory evidence of faecal egg counts or, better still, the *post-mortem* examination of one or more members of the affected group.

The egg-counting technique is easily carried out and affords a valuable aid to diagnosis. The apparatus required consists of a microscope fitted with a mechanical stage and giving a magnification of about 50 diameters, as may be had by using a two-thirds of an inch objective and a ×5 or ×6 eye-piece, a small balance with weights, a pipette that will measure accurately 0·15 c.c., a rubber teat for the pipette, a stoppered bottle to hold four ounces or more, some small glass beads or balls, coverslips, slides, a coffee strainer and a small spatula or knife. The method is as follows—to make a straightforward count, the various steps in their correct order of succession are:—

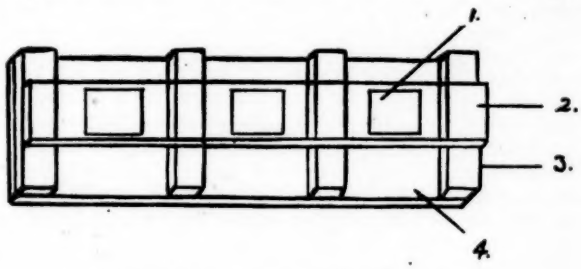
Stoll Egg-counting Technique

1. Weigh out 3 grammes from the sample of faeces.
2. Fill the stoppered bottle with water up to a mark indicating 42 c.c. (This mark may be made by scratching the glass at this level or by sticking a narrow strip of paper on to the outside of the bottle).
3. To the bottle—now containing 42 c.c. of water—add the 3 grammes of faeces and the glass beads. No more water must be added.
4. Fit the stopper in the bottle and shake until all the faecal material is thoroughly broken down. If a count is being made from faeces of a hard consistency, it is an advantage to allow the 3-gramme sample to remain overnight in the 42 c.c. of water before attempting to break down by shaking.
5. Separate the larger particles of debris by pouring the mixture of faeces and water from the bottle through the strainer, catching the screened fluid in a cup, small basin or other convenient vessel. Discard the material held back by the screen.
6. Stir the screened fluid to ensure an even suspension of eggs and, before they have had time to settle at the bottom, remove 0·15 c.c. with the measuring pipette.
7. Eject this measured quantity of fluid on to a microscope slide and cover with a seven-eighths inch square cover-glass in readiness for microscopical examination. Although the 0·15 c.c. of fluid forms rather a large volume on the slide and may appear to be too much for proper examination under the size of coverslip recommended, there is no real objection to a little liquid running out from under the edge of the coverslip. Eggs can, and indeed must, be counted in that part which is not covered by the slip, as well as in that beneath the coverslip. If it is desired, this spreading of the fluid can be controlled (*a*) by using a larger coverslip; this increases the area to be searched under the lens for eggs and consequently prolongs the time necessary for the examination of the sample; (*b*) by drawing two parallel lines, the width of the coverslip apart, across the slide with a grease pencil or piece of paraffin wax. These greasy marks prevent the watery suspension from flowing along the slide and thus overcome lateral spread.
8. Examine the 0·15 c.c. sample of suspension on the slide under the microscope and count all the eggs seen whether they be under the coverslip or in the fluid which has escaped from under the edges of the slip.
9. The figure obtained from the count (*i.e.*, the total number of eggs present in the 0·15 c.c. of the diluted faeces) is multiplied by 100 and gives an approximation to the number of eggs per gramme of the original faecal sample.

Gordon-Whitlock Egg-counting Technique

An improved method of counting worm eggs is that described by Gordon and Whitlock where a special double counting slide is used. This double slide contains three chambers, each having an area of more than 1 sq. cm. and a depth of 1·5 mm. The under slide, which constitutes the floor of the chambers, is wider than the upper slide or roof of the chambers and on the upper slide 3 sq. cm. are etched. (See diagram below.) The suspension of faeces to be examined for eggs is run into each chamber until the area marked by 1 sq. cm. is flooded. The three areas each marked by 1 sq. cm. are examined under the microscope and the number of eggs in each is counted. As the suspension of faeces is prepared with salt solution, the eggs quickly float to the top of the chamber and, being relatively free from faecal debris, are easily seen and counted. The method of examination is as follows:—

1. Weigh out 2 grammes of faeces.
2. Add 30 c.c. of a solution consisting of equal parts of saturated salt solution and water and mix thoroughly by shaking in a bottle with glass beads or balls.
3. Pass through a sieve to remove the coarser particles; then wash the debris with a further 30 c.c. of saturated salt solution and squeeze the debris as dry as possible.
4. Agitate the filtrate of faeces thoroughly by stirring and withdraw immediately with a pipette sufficient filtrate to fill one counting chamber. Repeat the operation until each counting chamber is filled.
5. Count all the eggs found within the areas of the 3 sq. cm. (To obtain the number of eggs per gramme of faeces, the total number of eggs counted is divided by 3 and multiplied by 200.)



1. Ruled area are 1 sq. cm. on under surface of 2.
2. Cover slide.
3. Supporting strip 1·5 mm. in thickness.
4. Basal slide.

It not infrequently appears that some indication is required of the general extent of infestation in the group of affected cattle. This may be obtained by collecting faeces from individual animals in a selected representative portion of the group, weighing or measuring a given quantity of faeces from each sample and thoroughly mixing all the quantities together. Three grammes of the composite sample are then examined for worm eggs in the usual way and thereby an indication is obtained of the approximate average infestation of the group.

Although several factors operate to detract from the accuracy of the egg count as a diagnostic test, diarrhoea or bulky food tending to lower the count and low diet or loss of appetite tending to raise it, the result is sufficiently reliable to provide a useful guide. It is, however, subject to even greater variation in cattle than in sheep owing to the greater influence of the bovine host in depressing the egg production of the female worms. Heavily infected animals may sometimes be found to pass no more than 400 eggs per gramme of faeces although the count may rise as high as 5,000 eggs per gramme. In general, however, 800 to 1,000 eggs per gramme may be taken as indicative of a pathogenic infestation, and anything over 400 in a yearling or a two-year-old animal as suspicious.

Worm-counting Technique

Undoubtedly, the most reliable diagnostic procedure is the *post-mortem* examination of a member of the diseased group of animals, and the estimation of the number of worms present in the fourth stomach and small intestine.

The method that is recommended for the demonstration of these worms consists essentially in the separation of the worms from the coloured matter and the smaller particles of food material that are present in the stomach and the first half of the small intestine so that the worms can be readily recognised and, if necessary, their numbers estimated and the species present identified. The apparatus required is as follows :—

1. A glass bowl or vessel large enough to hold four litres conveniently.
2. A metal sieve with a screen of about 50 meshes to the linear inch and with a diameter of eight to ten inches. The metal sides of the sieve should be approximately three inches deep above and one inch deep below the screen.
3. A 50 c.c. measuring cylinder.
4. A bulb pipette with an aperture of not less than 5 mm. which is wide enough to allow worms to be drawn freely up into the pipette.
5. One or two small shallow glass dishes, or the two parts of a petri dish are suitable.

The worms are best collected soon after the death of the host animal as they begin to disintegrate after one or two days in the putrefying carcase. The procedure to be followed in collecting the worms is to tie both ends of the fourth stomach with string and to remove it along with its contents to the place where the sieving process is to be carried out. The stomach is then opened and its contents caught in the large glass bowl. The contents are now diluted and mixed with two or three litres of water. The diluted contents in quantities of about 500 c.c. are poured into the sieve. After each 500 c.c. have been poured into the sieve it should be washed with a stream of tap water until no more coloured matter or food particles pass through the screen. Finally, when all the food material has been screened and washed in this way, the sieve is inverted over the now empty and clean glass bowl and, by means of a stream of water, the food material and worms collected on the screen are washed off into the glass bowl. The inside of the stomach is now exposed and washed by a gentle stream of water, the washings being caught in the sieve. After any further necessary washing of the material caught on the screen, the sieve is inverted and its contents washed into the glass bowl. Thus freed from coloured material and the finer food particles, the worms from the stomach contents and the surface of the stomach are readily seen. They may, however, be more easily recognised by the use of a hand lens, and when necessary individual worms can be removed and examined under the low power of the microscope. When it is desired to make an approximate count of the number of worms present, the contents of the glass bowl are made up to 4,000 c.c. by the addition of water. The whole is now stirred vigorously and, while still stirring, samples are removed by means of the bulb pipette and transferred to the measuring cylinder until 40 c.c. have been collected. Conveniently small quantities of this 40 c.c. are removed to the small glass dish and the worms counted. After all the recognisable worms have been counted in this way, doubtful objects may be examined under the low power of the microscope to ascertain whether they are worms or not. A number of infective larvae may be found in this material. The total number of worms found in the 40 c.c. multiplied by 100 gives the approximate number of worms recovered from the stomach. Counts of above 20,000 may be regarded as being of pathological significance. The majority of cattle that have died from parasitic gastro-enteritis show counts of above 30,000 worms in the abomasum and, with a little practice, it will generally be possible without making an actual count to estimate whether the number of worms is sufficient to account for disease.

The worms present in the small intestine may be demonstrated and counted in a similar way to those in the abomasum. It is necessary to examine only the first quarter of the intestine for the parasites. After removing this section of the gut from the mesentery, the contents are collected in the sieve and washed. The gut is then divided into convenient lengths of six to eight feet or more and water from the tap is run through each section of gut in order to wash out the remaining worms on to the sieve. The whole of the material on the sieve is finally washed and the worms collected in the glass bowl. As in the case of the stomach, the presence of 30,000 worms in the small intestine is generally incompatible with health. In heavily infested cattle, the counts for both the abomasum and the small intestine may occasionally be in the neighbourhood of 200,000 worms and total counts of 80,000 worms are common in diseased cattle.

Pathologically significant egg counts differ very considerably with the ages and sizes of the affected cattle and as comparatively little investigation has been carried out on the diagnosis of parasitic gastro-enteritis in these animals, it is not possible to state exact figures for the various ages. Nevertheless, since a significant infestation is numbered in tens of thousands and healthy cattle usually carry only a matter of hundreds, the worm count is often of considerable value.

When desired, the worms may be preserved in 2 per cent. formalin solution.

The collection of the worms is most easily made when a bench with a sink and running water are available, but it can be made wherever there is running tap water and it is sometimes valuable to demonstrate the large number of the parasites to the owner or cowman at the farm, thereby quickening his interest and stimulating his co-operation in the control of the disease.

When no screen is available, a rough indication of the extent of the infestation may be gained by passing a mounted needle or a similar piece of stiff wire through the contents of the stomach or the small intestine after these have been collected in a vessel. If the worms are present in large numbers, some of them will be caught up on the needle and may be seen after washing the needle in a small glass dish containing water. Should this procedure, after having been repeated three or four times, reveal few or no worms, it is an indication that the animal was not suffering from any excessive worm burden. It may be necessary, however, to remind those who attempt this procedure of the small size of the parasites and the ease with which they can be overlooked.

Sending of Material for Laboratory Examination.—When the veterinarian wishes to send material to a laboratory to be examined for worms, the fourth stomach complete with contents and the first 20 to 30 feet of the small intestine ligatured at both ends to retain its contents may be despatched in a tightly sealed container. An alternative method for convenience of despatch is the collection of a measured proportion of the stomach and of the small-intestinal contents, preserved with a little formalin, and sent in a bottle to the laboratory.

Faecal samples constitute the only other material that need be despatched to the laboratory and these should be sent well pressed down in small bottles so as to exclude air ; this will greatly retard the development of the eggs so that little or no hatching will occur before such time as the examination can be carried out.

TREATMENT—PREVENTIVE AND CURATIVE

Prevention depends largely upon the adequate nutrition of the animal, the avoidance of overcrowding, and the prophylactic use of anthelmintics. The application of substances

such as lime, kainit or copper sulphate to the herbage of infected pastures is of little or no use for the destruction of larvae, but a considerable reduction in the infestation of the pasture may be brought about through grazing it with animals that are not suitable hosts for these worms. Horses serve this purpose best, but are rarely available in sufficient numbers; grazing with healthy adult cattle or adult sheep will however, also reduce the infection of a pasture to a very considerable degree and these resistant animals will be in little danger so long as their diet is maintained at a reasonably high level and their state of immunity is such as to enable them to resist the development of the worms. Although not quite so satisfactory as in sheep, anthelmintic treatment is often very effective and should be carried out wherever a probable diagnosis has been made. Phenothiazine has not been tried so extensively in cattle as it has in sheep and its employment should be regarded as still in the 'field trial' stage. In some parts of the country it has given uniformly good results in hundreds of instances but in others it has produced toxic symptoms, sometimes of an alarming nature and occasionally terminating in death. This is one of those instances in which due regard must be paid to all of the principles governing anthelmintic medication: the dose should be carefully measured and should not exceed 15 grammes for a four-months-old calf, and 40 grammes for a two-year-old animal; particular care should be observed in the treatment of weak and debilitated animals for which the first dose should be smaller than that given to an animal that is in a more robust state; and in view of the group susceptibility sometimes experienced with poisonous drugs, such as anthelmintics are, phenothiazine should first be tried on two or three representative members of a large group of animals before proceeding with wholesale treatment. At the time the treatment is carried out a warning should also be given to the owner of the cattle about the red coloration of the urine which always follows the administration of phenothiazine.

The copper sulphate and nicotine sulphate mixture has also been employed with a certain amount of success, but is regarded as too dangerous for general use. Cattle frequently sway about immediately after having been dosed and they may even collapse. Although a fatal intoxication rarely occurs, and these alarming symptoms soon pass off, the veterinary adviser would do well to warn the owner before proceeding to give treatment.

Copper sulphate alone or copper sulphate and sodium arsenite do not produce these symptoms but their action is limited to infestations of *Haemonchus contortus* and they are therefore of less value than phenothiazine in the treatment of parasitic gastro-enteritis in cattle. Claims have also been made for a high efficiency from the use of tetrachlorethylene preceded by copper sulphate and followed by linseed oil.

The therapeutic use of anthelmintics entails their employment in adequate doses and the treatment of every member of the affected group, whether that member be showing symptoms or not. The members of a group of young cattle, however, often show greater variation in resistance to worm infestation than is seen among individuals in a flock of sheep, and instances arise, possibly on account of age variation, in which it may not be necessary to treat every member of an affected group; such instances are, however, exceptional. The first treatment during an outbreak of acute parasitic gastro-enteritis should be repeated in a week's time, and once or twice at fortnightly intervals thereafter. In all probability great benefit is to be derived from the prophylactic use of anthelmintics in young cattle, during the summer months and particularly in the autumn. The object of this treatment would be both to prevent the development of obvious outbreaks of parasitic gastro-enteritis, and to diminish the occurrence of poor thriving that is caused by infestations which are not severe enough to give rise to the obvious disease symptoms. In this connection, the young cattle should receive anthelmintic treatment on one or two occasions during the summer and autumn and a final treatment before they are housed at the beginning of the winter. Even a single treatment in the late autumn will produce a marked beneficial result.

The details of the recommended treatments are as follows:—

1. *Phenothiazine*

Reports of successful results following the use of this drug in cattle are sufficiently numerous to warrant its mention here as the most promising anthelmintic drug for use in parasitic gastro-enteritis of cattle. Occasionally it fails to act and, as intoxications have been reported, the drug must be used with caution. The following doses should be regarded as tentative:—

Calves, six to nine months ...	½ oz.	(15 grammes).
Calves, nine to twelve months...	¾ „	(20 „).
Yearlings...	1 „	(30 „).
Two-year-olds	1½ „	(40 „).

2. *Copper Sulphate*

Copper sulphate, 1 per cent. solution
(4½ grains to 1 fluid ounce)

Recommended doses:—

Calves up to twelve months ...	up to 4 oz.
Yearlings...	4 to 6 „
Two-year-olds	6 to 8 „

3. *Copper Sulphate and Nicotine Sulphate*

Copper sulphate, 1 per cent. solution.
Nicotine sulphate (40 per cent.), 1 per cent. solution.
A few drops of hydrochloric acid may be added to prevent the formation of a precipitate.

Recommended doses:—

Calves up to twelve months ...	up to 4 oz.
Yearlings...	4 to 6 „
Two-year-olds	6 to 8 „

Before dressing with copper sulphate or with the copper sulphate and nicotine sulphate mixture, a preliminary fast for 12 to 18 hours and the withholding of water for two or three hours after treatment is often practised but appears to exert little influence over the anthelmintic action of the drugs. The opinion has also been expressed that the treatment is thereby rendered safer; this also, however, is wanting in adequate confirmation. It is suggested that dosing should be carried out in the early morning before the first feed is given to the cattle. The use of copper sulphate and nicotine sulphate mixture has lost favour owing to the alarming symptoms which sometimes follow its administration.

4. *Tetrachlorethylene*

The administration of tetrachlorethylene in gruel is recommended as an alternative treatment; it may be repeated in 10 to 14 days. No preliminary fast is necessary, but care must be exercised in the administration as the inhalation of the vapour may cause acute respiratory distress.

Recommended doses:—

Calves up to six months old ...	2 drams
Yearlings...	3 „
Adults	5 „

Where sheep and cattle graze the same pastures, preventive anthelmintic treatment should not be confined to the cattle alone but should always include the sheep which are often responsible for the greater part of the infestation of the pastures. Treatment at three-monthly intervals might be adequate in many parts of the country, but in some places the benefit from more frequent treatment when constant

re-infestation is occurring might repay the trouble and expense involved.

Where parasitic gastro-enteritis is a frequent cause of trouble among cattle, the advisability of ploughing up the old pasture and directly re-seeding should be seriously considered. Benefit to young stock frequently follows the improvement to the nutritive value of the herbage which this procedure initiates, provided that the danger is avoided of putting young cattle too soon on to re-seeded land which immediately prior to ploughing had been heavily stocked with sheep.

In view of the absence of diagnostic symptoms in parasitic gastro-enteritis and the doubt which often exists as to the cause of a debilitated condition in cattle, the full use of mineral mixtures, including iron, copper and cobalt, is strongly advised.

Parasitic Bronchitis, Husk or Hoose

This is one of the most prevalent and most troublesome of the diseases of young cattle. It is usually associated with damp low-lying permanent pasture but is by no means absent from well-drained and dry pastures. Calves are the most susceptible, yearlings are also frequently affected; two-year-old cattle suffer less, but even adults are by no means immune and considerable losses sometimes occur among milking cows which are grazing on pastures that happen to be very heavily infested.

Causal Parasite

The parasite directly responsible for the disease is the metastrongylid nematode *Dictyocaulus viviparus* which gains entry to the body *via* the pasture herbage; losing its protective sheaths in the rumen, it is passed along to the small intestine and, penetrating the mucous membrane, makes its way into the lymphatics and from there to the blood stream by which it is carried to the lungs. Here it breaks through into the alveoli and gradually makes its way into the smaller bronchial tubes where it grows to maturity and produces eggs some five to six weeks after infection has taken place.

Symptoms

The most characteristic symptom of parasitic bronchitis is a husky cough which may be very slight and infrequent when the parasites are few. In chronic cases of this kind, however, there is often a marked debilitating effect which progresses to emaciation and is accompanied by gradual loss of appetite, dull staring coat, diarrhoea, pallor of the mucous membranes and sunken eyes. These cases may drag on for four or five months, or even longer before either death or recovery takes place.

Course of the Disease

In heavier infestations, the cough becomes deeper, stronger and more husky and at last appears in long continued paroxyms accompanied by dyspnoea and suffocation. During these attacks, the respiration is hurried, the flanks are agitated, the pulse is quickened and the conjunctivae injected; the animal stretches its neck, extends the head and opens its mouth; the tongue often protrudes, mucus flows from the nostrils; and saliva from the commissures of the lips. During the most violent paroxysms, the animal may fall prostrate on its side as a result of partial asphyxiation. When this occurs, the expression is haggard, the eyes protrude, the mouth gapes, and the tongue is pendulous. These coughing fits occur several times during the day, and single worms or masses of worms and streaks of blood may sometimes be seen in the mucous discharge from the nostrils or from the mouth. In these cases, an intercurrent pneumonia resulting from secondary bacterial invasion is frequently present. Still more acute cases occur in which the mass migration of infective larvae through the lung causes a pneumonia with accompanying high temperature and rapid pulse and respiration; death often ensues within a few days.

Post-mortem Appearances

Post-mortem examination reveals general emaciation (except in the most acute cases), the blood appears to be scanty and thin and there is a serous effusion into the peritoneal and pleural cavities. The inflammation of the bronchial mucous membranes is usually intense, pulmonary emphysema is almost invariably present together with secondary pneumonia. A considerable amount of frothy exudate may be seen in the trachea and bronchial tubes, and the edges of the lung present solid patches resulting from the infiltration of the exudate into the alveoli.

The worms—which are comparatively large, measuring up to three and a half inches—are found in more or less large bundles throughout all the branches of the bronchi and extending upwards into the trachea in the heavier infestations.

Diagnosis

Diagnosis depends upon the character of the cough, a suggestive history, and either the observation of adult worms in the expectorated mucus, or the finding of the characteristic larvae in the pharyngeal mucus or in the faeces. These larvae are unusually small, only 0·3 to 0·35 mm. in length, relatively thick for strongyloid larvae, and sluggish in movement. Examination of the faeces may be carried out as is recommended for the diagnosis of parasitic gastro-enteritis. The number of larvae excreted, however, appears to vary very considerably with the age of the host and the stage of the infestation so that the value of the larval count as an aid to diagnosis is limited. Nevertheless, faecal examinations are of considerable value in differentiating between parasitic bronchitis and some of the bacterial pneumonias which also often appear in epidemic form and produce a cough similar to if not identical with the cough of animals affected with husk. The probability is that housed calves showing a husky cough are suffering from the bacterial pneumonia, and that calves at grass, particularly towards the end of the summer and exhibiting similar symptoms, are suffering from parasitic bronchitis, but where doubt exists, a faecal examination should be made as the finding of larvae in the faeces in such an example might immediately clarify the diagnosis.

The diagnosis of parasitic bronchitis is easily made at *post-mortem* examination when a proper inspection of the lung reveals large numbers of worms. It is not sufficient, however, to make one or two cuts across the smaller bronchial tubes and to observe merely the presence of worms; husk-worm infection without disease production is a common occurrence and, for positive diagnosis, the parasites must be found in large numbers. The examination for this purpose is best carried out with a moderately large pair of sharp-pointed scissors by means of which the trachea and the bronchial tubes are laid open from end to end and the contained masses of worms exposed; these will be seen, in a positive case, to be completely occluding the lumen of many of the smaller tubes, and in severe cases, even of the larger tubes.

Epidemiology

The conditions required for the development and spread of the disease are governed by the suitability of the environment to the needs of the husk worm, both during its parasitic life in the host and during its free life on the ground. Like other strongyloid larvae, the free-living larvae of *Dictyocaulus viviparus* require a certain amount of warmth, moisture and oxygen for their development. On first reaching the ground in the faeces they are not ready to infect another animal, but under optimum conditions they pass rapidly through the first

and second larval stages and may reach the third or infective stage within four days. Many of the details of their reactions to environment in free life are still obscure but husk-worm larvae appear to be very feeble climbers and are much less able to make their way up into the herbage than are the larvae of the worms associated with parasitic gastro-enteritis. They are also considerably more susceptible to dryness and it may be for this reason that low-lying pastures are the worst for parasitic bronchitis. Another peculiarity is that they are able to continue their development at lower temperatures and can retain their vitality in shallow water for much longer periods. These different reactions indicate certain differences in the epidemiology of the diseases. In addition to the association of husk with damp pastures, there is the special danger in this disease of cattle drinking contaminated water, although this does not appear to be of importance in parasitic gastro-enteritis. A third difference is the improbability of infection being conveyed by hay because, in the first place, hay is unlikely to be infective since very few larvae climb into meadow grass, and, in the second place, the drying of the hay more easily kills those few that do succeed in climbing up. Fourthly, aftermath may be a danger in husk although it is not so in parasitic gastro-enteritis in which instance most of the larvae are taken off the field in the hay; and finally, ploughing usually disposes of most of the sluggish husk-worm larvae which are unable to regain the surface after having been buried, whereas the larvae of the worms associated with parasitic gastro-enteritis quickly make their way upwards through the soil again.

The reason for the very prevalent belief that dewy mornings, especially in the presence of a mist, are particularly dangerous is not known, and the explanation may be not more than the coincidence, in the late summer and autumn, of both parasitic bronchitis in cattle and the so-called ' dew ' on grass. (The droplets seen on the herbage during the autumn are an excretion from the leaves and are not condensed water vapour.) On the other hand, there may be some other reason which has not yet come to light concerning the migration of larvae so that it would be unwise to disregard such a widely held and deep-rooted belief.

There appear, however, to be certain dangers associated with manure heaps and dirty stockyards where a small amount of herbage may be growing. Observations suggest that such herbage is sometimes loaded with infective husk-worm larvae, and sudden outbreaks of acute husk may be traced to the placing of cattle, sometimes only for a few hours, into surroundings of this kind. So acute may these infections be that death from pneumonia sometimes occurs before the appearance of larval worms in the faeces, *i.e.*, four or five weeks after exposure to infection. Occurrence of acute disease of this kind is not uncommon among milking cows and enquiries should always be made wherever it occurs for a history of the animals having been turned into a disused yard or small paddock containing an unguarded manure heap.

Small fields and orchards adjacent to the farm buildings are particularly prone to carry heavy husk-worm infection. Aftermath is also a danger, wherein husk infection differs from parasitic gastro-enteritis; the husk-worm larvae are not taken off with the hay to the same extent and may remain alive at the bottom of the meadow grass for several months. The proper fencing of manure heaps is an important point, as also is the proper drainage of rain water which has washed the surface of the heap. Care should also be taken that infected manure is not placed on to any grassland, either pasture or meadow, that is likely to be grazed by cattle. This appears to be much more important in connection with the prevention of husk than it is for the prevention of parasitic gastro-enteritis.

Treatment of Pasture.—The eradication of infection from a pasture is beset by difficulties similar to those obstructing the eradication of trichostrongylid larvae. Dressing the ground with artificial manures or poisonous substances is of little or no use; the situation is easier, however, in that no other kind of farm stock is susceptible to infestation with the lung worm of cattle, so that, in addition to horses, sheep may be used for the cleaning of pasture land. Very considerable benefit is likely to be derived from close grazing with these insusceptible animals. It must not be forgotten, however, that an environment which has proved dangerous for the lung worm of cattle will also prove dangerous for the closely allied lung worm (*Dictyocaulus filaria*) of sheep which may run a similar risk from their own parasites. These animals are, however, less likely to suffer from lungworm disease than are cattle and the risk is not a very great one.

Immunity.—The relative susceptibility of young cattle is a very important point concerning the epidemiology of this disease, and is dependent (as in parasitic gastro-enteritis) partly upon age and partly upon previous infestation. Young calves are the most susceptible, the resistance gradually developing throughout the first two years of life. Although healthy adults are sufficiently resistant to withstand all ordinary infestation, they are not proof against massive doses of the larvae and the atypical acute form of the disease in which pneumonia develops is by no means rare, even in animals on a full diet. Channel Island cattle, which appear to be the most susceptible at every stage, are also the most likely to suffer from the acute form of the disease. A low nutritional level may so reduce the resistance of adults that they contract a heavy infestation under conditions in which the rate of intake of infective larvae is not unusually high, and wherever there is a danger from these parasites a really adequate maintenance diet should be provided.

Treatment—Preventive and Curative

Prevention depends upon the maintenance of the state of nutrition at a reasonably high level and the protection of susceptible animals against heavy infestation. For this purpose, it is necessary to maintain a continued vigilance in connection with the disposal of manure, the fencing of manure heaps, avoidance of dirty yards that are heavily contaminated with bovine faeces, and the management of the small paddocks in the proximity of farm buildings. In some localities, the risk of severe infestation among calves is so great that it is better to keep them in the buildings altogether during their first summer. Constant moving of cattle is a help towards the limitation of infestation and the alternate grazing of the pastures with stock other than cattle is of great value.

Anthelmintic treatment directed against the lungworms themselves gives little help. A course of treatment for parasitic gastro-enteritis is, however, strongly recommended as the two conditions are commonly present at one and the same time, and the cure of one will often result in the animal being able to deal with the other itself. The intratracheal injections often given in husk are considered by some practitioners to be effective. The following mixtures are among the most popular for this purpose: (*a*) turpentine—2 c.c., phenol—1 c.c. and chloroform—2 c.c.; or (*b*) one part of beechwood creosote in ten parts of glycerine, the dose being 2 to 4 c.c. The injection should be given slowly and, as far as possible during inhalation; it should be repeated three or four times at intervals of three to four days. There can be no doubt that pneumonia resulting from secondary bacterial invasion of the affected lung is often a contributory cause of death in severe cases of parasitic bronchitis but the use of sulphonamides appears to have little effect. Claims have also been made for the beneficial result of vaccine treatment but this appears to require further confirmation before a general recommendation

can be made. Removal from the infected pasture, good housing, good feeding, together with measures to eliminate the stomach worms are, however, much the more important part of the treatment, and intratracheal injection without attention to these important points would be of very limited value.

Fascioliasis or Fluke Disease

This disease may affect cattle of any age, excepting sucking calves that have never been out to grass. It may appear in two forms—an acute form, which is rare in cattle and is caused by a mass migration of large numbers of immature *Fasciola hepatica* through the parenchyma of the liver; and a more common, chronic form caused by the continued presence of numerous adult flukes in the bile ducts. The incidence of the disease is largely explained through a knowledge of the life history of the parasite, this, in its turn, being intimately linked with that of the snail, *Limnaea truncatula*—the only species of snail that can function as the intermediate host in Great Britain.

Important Details of Life History.—One or two important details in the life history of the fluke may be recalled with advantage although in general the complicated cycle of changes through which the parasite passes is well known. The hatching of the eggs and consequent liberation of the miracidium may take place within nine days of leaving the final host; under unsuitable conditions, however, hatching may be retarded and the eggs remain viable for upwards of five months. Development in the snail takes place in six or seven weeks, at the end of which time the cercariae leave the snail and encyst on the herbage and are then ready to begin their parasitic life in the final host; their length of life on the pasture, after leaving the snail, extends up to twelve months. On reaching the small intestine of the final host, the young flukes penetrate the bowel wall and, after a few days spent in the abdominal cavity, make their way into the liver, and wander about the parenchyma for some five or six weeks, during which time they grow to a length of 3 or 4 mm. They then enter the bile ducts and reach maturity; eggs appear in the faeces of the host 11 to 13 weeks after infection. The presence of malformed eggs in the faeces indicates the acquisition of infection between 11 and 13 weeks previously as the first eggs to be produced are malformed. In certain circumstances this information may assist in tracing the site where the infection was acquired.

Epidemiology

The epidemiology of the disease is inseparably connected with the phases of the life cycle of *Limnaea truncatula* which begins to be active in March or April when it lays eggs that give rise to a generation of snails which produce more eggs three or four months later. Two or even three generations may occur between March and October and, if the environmental conditions are suitable, a great increase of snails takes place. The emergence of young flukes, therefore, begins in early July but the larger number of cercariae—those from the first brood of young snails—do not appear until later in the year (in August or September) so that the earliest outbreaks of acute fascioliasis are not likely to occur until October and the outbreaks of chronic fascioliasis not until December, becoming more serious and perhaps more widespread as the winter progresses.

In general, fascioliasis is less acute in cattle than it is in sheep; whereas 50 flukes are capable of producing clinical symptoms in sheep it has been estimated that some 250 are necessary for the production of the same effect in cattle. Fatal infestations do occur and are not uncommon in young animals, but the chief loss is through lowered milk production and the retarded rate of growth of young animals. It appears that, in general, farmers fail to appreciate the importance of the disease in cattle, tending to regard it exclusively as a disease of sheep, and in some places it is actually the common practice, when taking sheep off fluke-infested land, to place cattle there in the belief that they are immune from liver-fluke disease.

An interesting variation in the pathology of the disease in cattle is the calcification of the bile ducts. This does not occur in sheep where the walls of the bile ducts become only thickened by fibrous tissue. A recent examination of abattoir returns showed that some 600 tons of bovine livers were destroyed during twelve months in this country, in a year when losses were particularly low, and it was estimated that the annual loss in destroyed bovine livers alone is some £200,000. In assessing the total loss due to fluke in cattle, however, it would be necessary to include reduced meat, milk and possibly calf production in infested animals, and it is obvious that the total loss must be very great.

Symptoms

The symptoms of chronic fascioliasis develop very gradually among a group of cattle, loss of condition being one of the first to be observed. Debility becomes more obvious as the disease progresses, dropsical swellings appear under the jaw and abdomen, the mucous membranes have a marked anaemic appearance and ultimately a state of emaciation is reached. Finally, at *post-mortem* examination of the carcase of an animal that has died of the chronic disease, the emaciated condition is clearly seen; there is an excess of fluid in the abdominal cavity, the liver is small and cirrhotic, and the bile ducts are greatly enlarged and thickened, showing as white bands on the abdominal surface of the liver. On being cut open, these ducts will be found in a more or less calcified condition and to contain numbers of adult flukes.

The acute form of the disease, however, may appear in animals in fat condition and death may supervene after only a few days' illness. The affected animals stand apart from the remainder of the herd and show a marked disinclination to move; the abdomen often becomes distended and is painful to the touch.

Diagnosis

Diagnosis of the acute form is difficult as the eggs of the fluke cannot be demonstrated, the flukes not being old enough to ovulate at the time when symptoms appear, so that an isolated outbreak of acute fascioliasis is often only determined with certainty at *post-mortem* examination. A blood-stained fluid may then be found in the abdominal cavity and the liver is enlarged, haemorrhagic and friable. If the cut surface is squeezed in water and the sediment carefully washed by decanting and resedimenting two or three times, a number of immature flukes up to one-quarter of an inch in length may be recovered.

The diagnosis of the chronic form of the disease depends upon the coincidence of the rather indefinite symptoms to which reference has already been made, and a history of grazing on fluke-infested ground or information relating to fluke infestation among the sheep on the farm. The symptoms, which typically appear during the autumn or early winter, should be obvious in several members of the group of animals that are concerned, and the suspected diagnosis may then be confirmed by the demonstration of the eggs of *Fasciola* in the faeces.

With reference to the identification of the eggs in the diagnosis of the chronic disease, it is better to rely upon the large size and bright yellowish green contents which completely fill the shell, rather than upon the lid or operculum which is present at one end of the egg but is difficult to see in eggs that have recently been passed in the faeces. The ordinary flotation technique cannot be employed in searching for these eggs since they do not rise to the surface in the

ordinary salt or sugar solutions used for this purpose. They are best found by the employment of the dilution technique already referred to in the section on parasitic gastro-enteritis. A count may then be made, if desirable, 200 eggs per gramme being a rough indication of the presence of a pathogenic infestation. Since, however, the development of the fluke in the host is so slow, the infestation is frequently heavier than the egg count indicates so that the finding of any fluke eggs in the faeces during the later summer, autumn or early part of the winter suggests the need for treatment.

Caution must be observed in accepting as diagnostic evidence the finding of the intermediate host snail *Limnaea truncatula*, since immature specimens of other common members of the genus *Limnaea* can only be distinguished on expert examination.

TREATMENT

Treatment in cattle is more difficult than in sheep on account of their greater sensitivity to carbon tetrachloride. This sensitivity is such as to render the use of the drug too unsafe for cattle in the lowlands. In the mountainous districts, carbon tetrachloride may be used in calves and cattle in store condition up to two years old with comparative safety, but even in these animals a certain amount of caution must be observed.

Standardised male fern extracts such as ' Danistol ' are the safest drugs for cattle but are both troublesome to give and expensive. The recommended doses are: for yearlings, one to two drams; for two-year-olds, two to three drams; and for adults, three to four drams; repeated on two consecutive mornings, after fasting. Extract of male fern is given in a similar way in double these amounts. The filicin content of ordinary extracts is, however, variable and less reliance can be placed upon their satisfactory action.

Hexachlorethane has been strongly recommended but has not received adequate trial in this country. The recommended dosage is six drams per 100 pounds body weight and is spread over four successive days, being given in the morning three or four hours before feeding.

Control of the Intermediate Host.—The veterinary practitioner should be in a position to give valuable advice to the farmer concerning the control of the intermediate host snail, the limitation of its breeding place by draining and the cleaning of existing open drains. The last-mentioned operation is important in many situations as in addition to assisting the escape of water, it has the effect of confining the snails to steep-sided ditches where stock cannot graze. If this operation is carried out during the late summer or autumn, however, it is important that the mud and weeds taken out of the ditches be immediately removed from the field, as otherwise the cercariae-bearing snails are merely being taken out of the ditches where they were comparatively inaccessible and placed on to the pasture where the cercariae contaminate the herbage.

Copper sulphate dressing of the infective pastures for the destruction of *Limnaea truncatula* may be practicable, giving the best return on farms where the breeding places of the snail can be traced to one or two circumscribed areas, and is particularly valuable after a prolonged drought when the snail-infested area may have become very considerably reduced. The best way to apply the dressing is to broadcast by hand a mixture of one part of powdered copper sulphate to four parts of sand at the rate of 20 pounds of copper sulphate to the acre. The dressing of small areas might with advantage be repeated two or three times at weekly intervals during the drought period.

DICROCOELIUM DENDRITICUM *as a Cause of Liver-rot.*—The small liver fluke *Dicrocoelium dendriticum* is of frequent occurrence in some parts of the West Coast of Scotland and in the Western Hebrides. Although less pathogenic than *Fasciola hepatica*, when present in large numbers it is capable of causing the same pathological changes and the same train of symptoms. Certain land snails serve as intermediate hosts. There is little doubt that these would respond to the broadcasting of copper sulphate and sand as recommended for the control of *Limaea truncatula* but the large areas requiring treatment would render the procedure impractical because of the high cost. No effective anthelmintic treatment is known. (*To be continued.*)

CLINICAL COMMUNICATIONS

Necrosis of the Mucous Membrane of the Bladder

F. CHAMBERS, O.B.E., F.R.C.V.S.,
WOLVERHAMPTON

During the past month I have seen two cases of a condition in cattle which I have never experienced before.

The first case was in a Friesian heifer—purchased from a T.T. herd a week previously. She had calved three weeks before purchase. The owner stated that for some days she had difficulty in micturating, had gone off her food and the milk yield had decreased.

When I saw her she was in obvious abdominal pain. The expression was anxious and when made to stand up she passed a small quantity of urine.

On the lips of the vulva were a number of small calculi. Rectal examination revealed a bladder as large as a football.

Vaginal examination. There were a number of calculi on the floor of the vagina. The meatus urinarius was not easily found but eventually it was plain that some kind of tissue was protruding from the orifice. This tissue was grasped and gradually teased out of the bladder. Eventually a piece of membrane about 5 in. by 4 in., very evil smelling, was extracted. This was covered with numerous calculi. A large quantity of urine was now voided. The bladder was washed out with a weak solution of CMX (chloro-meta-xylenol) (Wyley's) in water and four doses of liq. ammon. acet. left—one to be given night and morning. Recovery was rapid. The appetite returned and the heifer next day was seen to be chewing her cud and the milk yield came back to normal.

The second case, seen a week later, was in a three-year-old Shorthorn. She had been found early one morning in the field with the head and fore legs of a calf projecting from the vulva. With assistance the calf was delivered. It probably had been in the position found for some hours. The heifer never properly regained the normal and did not milk or eat well. Two weeks after calving she went right off her food. She lay down most of the time. When seen by me she was in great distress and showed severe abdominal pain. When made to get up on her feet she tried to urinate but without result. Rectal examination revealed the bladder to be distended with urine.

Vaginal examination showed a similar condition existing to that in the first case. Projecting from the meatus urinarius was a portion of membrane. This by gradual traction was removed and revealed itself to be a complete mucous lining of the bladder. The bladder was washed out with a hot solution of CMX in water and four doses of hexamine were left, one to be given night and morning.

Recovery in this case was rapid and uneventful.

It is difficult to explain why the bladder wall should slough out unless some infection had gained access and caused the death of the mucous membrane. Pressure exerted over a period could not possibly damage the whole of the bladder.

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Acute Uraemia in a Calf

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A brown buffalo-calf, aged about six months, was feeding and ruminating well but on November 7th, 1944, in the evening, it suddenly became dull and off food, and was found dead in the shed the following morning. As narrated by the attendant, the fodder of the calf was changed the very day of the attack.

Post-mortem Examination.—Microscopic examination of the blood films was negative for *Bacillus anthracis*. The rectum was distended with hard dung balls, its mucous surface being acutely congested. The bladder was much distended with urine. The pelvis of each kidney was filled with urine, the cortex presenting a flabby and a water-logged appearance. There were numerous petechiae and haemorrhages on the myocardium and under the endocardium.

Discussion.—The impacted rectum caused pressure on the neck of the bladder and the urethra, resulting in retention of urine in the bladder, ureters and kidneys, death occurring from uraemia.

ABSTRACTS

[Hypertrophy of the Prostate Gland. Gadd, J. D. (1944.) *J. Amer. vet. med. Ass.* **104**, 802. 15-18 (7 refs.).]

Prostatic enlargement is most common in old dogs. It is invariably benign and often associated with difficult defaecation and micturition and appears to be primarily responsible for perineal hernia.

The author has found that in cases of simple hypertrophy reduction in size of the prostate can be achieved without resorting to castration. The operation favoured consists of a partial prostatectomy, the technique of which is as follows :—

The approach to the prostate is by means of a prepubic incision, lateral to the penis and extending from the pubic brim anteriorly to approximately half an inch in front of the penis. Omentum and intestines are packed out of the way and a hand inserted into the abdominal cavity grasps the prostate gland and pulls it upward and forward. Each lobe of the gland is incised with a double convex incision 1 in. to 1½ in. long, to a depth of ½ in. at a site which is least vascular. A narrow wedge of tissue is removed to prevent too rapid healing. Excessive haemorrhage is controlled by ligatures if necessary and sterile sulphathiazole powder is sprinkled over the raw surfaces.

The author's experience shows that the prostate decreases to less than half its previous size in less than two months with continuance of normal sexual function.

C. F.

* * * * *

[Experimental Infections with *Eimeria bovis* in Calves. Hammond, D. M., Davis, L. R., and Bowman, G. W. (1944.) *Amer. J. vet. Res.* **5**. 303-311.]

The authors carried out six experiments at different times with 15 calves varying from one day to two months of age and reared free from *Eimeria bovis* infestation. The calves were fed from 1,000 to 1,000,000 sporulated oocysts of this species and all, save one, showed evidence of infection by the discharge of *E. bovis* oocysts 16 to 21 days after the experimental feeding and by diarrhoea and/or bloody diarrhoea not only in those calves fed the larger doses but in some animals fed smaller doses of infective material. Excluding two calves which developed pneumonia (one showed no evidence of infection from the experimental feeding while the other apparently developed only a very light infection) seven of the animals, which had been fed 125,000 or more oocysts, developed marked symptoms starting, with one exception, 18 days after inoculation. Each of these seven animals showed a definite rise in temperature to a peak ranging from 104·4° to 106·6° F. during the time it was showing symptoms and five of them died or were killed in a moribund condition 24 to 27 days after the oocysts were fed. All the calves which died showed marked pathological changes in the caecum and colon and numerous *E. bovis* oocysts in these regions. There was a relatively heavy discharge of oocysts starting 18 to 20 days after feeding and lasting for five to six days in most of the calves after which small numbers of oocysts were passed in the faeces for two to three weeks and then they could no longer be detected. The authors consider that their experimental results indicate that, in calves previously uninfected with *E. bovis*, the number of oocysts ingested was the factor of greatest importance in determining the severity of infection.

J. N. O.

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[Isolation of Bacillus *anthracis* from Spinoza Ear Ticks *Ornithodorus megnini*. Stiles, G. W. (1944.) *Amer. J. vet. Res.* **5**. 318. (4 refs.).]

B. anthracis was isolated from a colony of spinoza ear ticks (*Ornithodorus megnini*), in various stages of development, attached to the ear of a cow dead of anthrax. The organism was not isolated from engorged nymphs on two other cows which died of anthrax. Whether these ticks are involved in the spread of anthrax might be a factor of importance in the control of this disease.

A. W. G.

Weekly Wisdom

" *Thou grasyer that mayst fortune to be of myne opinion or condytion, to love horses, and young coltes and foles, to go among thy cattle, take hede that thou be not beguiled, as I have been a hundred tymes and more. And first thou shalt knowe that a good horse has 54 properties; that is to say, 2 of a man, 2 of a badger, 4 of a lion, 9 of an oxe, 9 of a hare, 9 of a foxe, 9 of an asse, and 10 of a woman.*"—From the *Boke of Husbandry* by Sir A. Fitzherbert, Judge of the Common Pleas under Henry VIII.

Questions and Answers

" Questions and Answers " will be published on alternate weeks.

The submission of questions for inclusion in this column will be welcomed. They can relate to any aspect of veterinary work and where publication of the name of the enquirer is not desired, a pseudonym should be supplied, the name and address also being given.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

Removal of " Flights "

Q.—*What is the best method of removing " flights " from the eye in horses and cattle ?*—" *Orbital.*"

A.—Much depends on the length of time the " flight " (or " flyer ") has been in the eye. Difficulty is greatest when amateurs have made prolonged efforts at removal, as the animal's eye will be necessarily sensitive. It is advisable to take with one to such cases, a pair of fine-pointed dressing forceps, local anaesthetic solution, and if possible, an eyelid dilator for forcing the lids apart.

At first do not handle the patient, but approach quietly on the affected side. The eye may close at your approach, but usually opens again, when the location of the " flyer " in relation to the cornea should be noted. Having got so far, get a strong assistant to " nose " the bovine (or twitch the horse) and turn the head sideways, first one way, then the other, until the eye rolls in its socket to give maximum exposure of the " flyer." It is often necessary to experiment by rotation, elevation, and depression of the head before this optimum position is found. Then rest the little-finger edge of the right hand close to the eye, holding the forceps close to the lids. If the eye opens after a few moments, then is your opportunity for a firm, gentle dab with the forceps. If the animal does not open the eye, part the lids gently with the finger and thumb of the left hand. It is usually possible to seize the " flyer " within two or three attempts. Patience and gentleness are essential.

If previous interference or awkward temperament makes the patient fractious, restraint will be indicated. Local anaesthesia is rarely necessary in recent cases, but old-standing cases are best dealt with by its aid. The most effective form of local anaesthetic is cocaine, either in solution, or in the form of readily soluble " oculets " : anaesthesia is rapid and effective.

Beware of attempting to remove the cicatrix left by a departed " flyer "—the scar where it has lain on the cornea can look very like the " flyer " itself, and is a booby trap to the careless.

I have heard that insufflating castor sugar into the eyelids will often shift a " flyer," and castor oil is also recommended, but I have no experience of these in use, as they are effective only in very recent cases, and the veterinary surgeon generally gets them 24 hours old, by which time the " flyer " is well anchored to the cornea.

Method of Use of Proflavine in the Treatment of Wounds

Q.—*Will you please advise me how to use proflavine in the treatment of wounds ?*—" *Therapy.*"

A.—Proflavine may be used as a lotion or as an oleate. It is soluble one in 300 of water, one in 48 of alcohol 90 per cent., one in ten of glycerin, but insoluble in liquid paraffin. As distinct from acriflavine it is compatible with normal saline solution and it resembles acriflavine in being strongly bactericidal for all the common pathogenic bacteria. As weak a solution as 1 : 200,000, it is stated, will kill *Staphylococcus aureus* in the presence of serum. For the treatment of wounds a 1 : 1,000 solution is generally used, a convenient way of making which being to dissolve an " Isoflav " (proflavine sulphate) tablet into 4 oz. distilled water. Fresh wounds may have a preliminary thorough cleaning with this solution, and they may usually be sutured at once with little fear of sepsis if some of the liquid is left in the cavity. For suppurating wounds the solution is used to swab out the open wound once or twice daily after free drainage has been procured. All cracks and crevices must be reached and sloughs removed. Then lightly pack with gauze soaked in the solution and cover with a protective. The writer very frequently prefers to use an emulsion on account of the ease with which dressings can later be removed. But proflavine, on account of its poor solubility, does not lend itself very well to the preparation of an emulsion, so he uses acriflavine emulsion which in germicidal power is little if any inferior to proflavine, although it may be slightly more toxic and more irritating to delicate tissues such as the brain or peritoneum. But never has the writer observed either toxic or irritant effects from either substance in general practice.

Treatment of Suppression of Oestrus and Milk Secretion in Bitches

Q.—*What is the most beneficial treatment for the suppression of oestrus and milk secretion in bitches—would methyl testosterone be of any use and, if so, in what dosage ?*—" *Curious.*"

A.—The best way of suppressing oestrus is obviously by ovariectomy. If this is not practicable, oestrus could probably be suppressed

by progesterone but under present circumstances this treatment would be expensive.

Testosterone propionate (by injection) or methyl testosterone (orally) could be tried: dosage of 10 mg. for small breeds and 20 mg. for large breeds. For suppression of lactation diethyl stilboestrol is probably the best treatment (1 to 5 mg. orally daily for three days depending on the size of the bitch) but as this might also cause nymphomania the testosterone preparations might be tried as an alternative.

"Tortoiseshell" Cats

Q.—*What is the incidence of male three-coloured (so-called tortoiseshell) cats, and have such animals any special value owing to their scarcity?*—"*Felix.*"

A.—There are no statistics to show the incidence of three-coloured male cats, but such specimens are undoubtedly rare. Male tabby cats not infrequently have reddish or yellow tints in the coat but cannot be called true three-coloured cats. The writer has seen one male "tortoiseshell" cat (it had unfortunately been castrated at a welfare society's clinic) and knows of one other authenticated case, both within the last three years.

The value of such cats lies in the fact that their genetical make-up is something of a curiosity and therefore from the point of view of genetics their breeding potentialities would be of interest. The writer knows of no case in which a male three-coloured cat has been bred from, but has heard the suggestion that although anatomically they are normal males, in fact, they are impotent.

Removal of Dark Spots from White Pigs

Q.—*Can you recommend a method of removing dark spots from white pigs?*—"*A.*"

A.—The small dark spots on the skin of white pigs are removed by pigmen by rubbing the spots with very hot potatoes.

Sale Value of Practice

Q.—*What is to-day considered the sale value of a veterinary surgeon's established good practice? In pre-motor days it was usually considered one year's gross return or one and a half years' profits.*—"*Senex.*"

A.—There is no absolute and set method of valuing the goodwill of an established practice, but the usual method of forming a basis for valuation is the average of the three previous years' gross turnover. [It should be remembered, however, that some practices are so personally dependent on the reputation of the practitioner that the goodwill cannot well be transferred.] If the practice is increasing this may raise valuation, if decreasing lower it. The purchaser would also wish to take into account the fact that fees and hence turnover are somewhat inflated due to war-time conditions.

The stocks of drugs, instruments, cars, fittings, etc., also the premises (or leases on same) would be valued separately and in the usual way.

Correspondence

Oesophageal Obstruction due to Sugar Beet Pulp

Sir,—With reference to "Oesophageal Obstruction due to Sugar Beet Pulp" in "Questions and Answers" in your issue of December 30th, 1944, I would like to mention that I have treated the condition successfully and quickly by the simultaneous use of two stomach tubes—one down each nostril.

A continuous stream of warm water is kept up by pouring the water through a tun-dish down one tube. [I prefer to use the force of gravity rather than the pressure of a pump.] As the water flows out through the other tube the pieces of pulp are gradually washed away. I have treated many cases in this manner and have never had a case of inhalation pneumonia.

The advantages of this method of treatment are obvious as the condition is generally relieved in from five to 15 minutes, instead of leaving both patient and owner to suffer from three to four days, as suggested.

Yours faithfully,

Lismacue, William Baker.
Bansha, Co. Tipperary.
January 13th, 1945.

The Closed Plaster Treatment of Wounds

Sir,—With reference to the above question in "Questions and Answers" of January 27th, it may be of interest to your readers to observe the following case: A one-year-old cat was brought to my surgery in October, 1944, with a five-weeks-old abscess ½ inch above the left carpus. A fracture with distinct crepitation was felt and the owner advised to have the animal destroyed, but the owner insisted that everything possible should be done. The wound was cleaned and covered with a thin layer of gauze soaked with Pennotin over which a four-layer strip-plaster was moulded. No swelling appeared at inspection two days later and the plaster was left in position. 3·75 grammes of sulphapyridine were given over three days.

The bandage was removed after three weeks. One bone-sequestrum the size of a pea had lodged itself just in the opening of the abscess and was removed. A light Elastoplast bandage was applied and the leg healed without any incident. I had occasion to see the animal a few days ago and it walks without limp on all fours.

Yours faithfully,

91, Watford Way, E. von Lustig-Lendva.
Hendon, London, N.W.4.
January 29th, 1945.

QUESTIONS IN PARLIAMENT

Cows (Market Classification)

Brigadier-General Clifton Brown asked the Minister of Agriculture whether he is aware that cows which have passed a tuberculin test are being sold at markets as such, though they have not come from tuberculin-tested herds; and, in view of the danger that these cows may have contacted tuberculous animals since their last test, will he tighten up the regulations accordingly, so that only cows from tuberculin-tested herds can be qualified for a T.T. certificate.

Mr. T. Williams: The reply to the first part of the Question is in the affirmative. With regard to the latter part, the only markets that are subject to official regulation as to the classes of cattle that may be sold are those authorised under the Tuberculosis (Attested Herds) Scheme. At such markets the only cattle that may now be sold are cattle from herds within this Scheme, and cattle from herds licensed for the production of tuberculin-tested milk.

Milk Production (Inspections)

Rear-Admiral Beamish asked the Minister of Agriculture what progress has been made towards recruiting the necessary staff for the inspection of milk producers' premises under the Food and Drugs (Milk and Dairies) Act, 1944; and whether the appointed day can now be named.

Mr. T. Williams: No steps have yet been taken to recruit additional staff for the purpose mentioned by my hon. and gallant Friend, and it is unlikely that any progress in that direction will be made while the war with Germany continues. Consequently my right hon. Friend is not in a position to give any indication of when the "appointed day" for the Act of 1944 to come into operation will be fixed.

Breeding Experiments

Sir P. Hurd asked the Minister of Agriculture what stage has been reached at the animal research station at Cambridge under Dr. John Hammond in the treatment of cows of good beef type so as to induce the birth of twin calves, thereby promoting the more economical production of high quality beef in this country.

Mr. T. Williams: The work at this station on the inducement of twinning in cattle by the injection, before mating, of pregnant mare serum hormone has not reached the stage at which its practical application can be recommended. Attempts are being made to test the use of the method under commercial conditions with a few cows on farms in the eastern counties.

Farm Buildings (Standardisation)

Major Mills asked the Minister of Agriculture if he can make any statement on the standardisation and production of agricultural buildings in the post-war period.

Mr. T. Williams: My right hon. Friend is informed that the Committee on Farm Buildings has made a thorough examination of the subject of standardisation and other methods of simplifying construction in the post-war period, and that the Committee's Report will include recommendations on these matters. He expects to receive the Report very shortly.

Members of the profession will be interested to know that the subject to be dealt with in the B.B.C. Home Service feature programme "This is the Law" on Sunday next at 6.30, will be "The Law in relation to Animals."

* * * * *

An Isle of Man Government order has been issued providing for compulsory vaccination of all female calves against epizoötic abortion, in the hope of eliminating this scourge from the island.

MEMOIRS

Principal Donald Campbell

Nigh on 37 years ago there entered the veterinary profession one who, although he chose the individualistic path of the general practitioner, was destined to exert a wide and powerful influence on the affairs of his fellow-members. Such was Donald Campbell, veterinary surgeon, Captain late R.A.V.C., and, latterly, Principal of the Glasgow Veterinary College, who died with such tragic suddenness at his home, 80, Hamilton Road, Rutherglen, on the evening of Thursday, January 25th, 1945.

Principal Campbell was born in 1885 in Rutherglen, of which ancient Royal Burgh his father was a magistrate and, by all accounts, a fluent speaker. The family already had connections with the veterinary profession in the persons of two uncles who were well-known Lanarkshire practitioners, namely, Mr. John Campbell, of Rutherglen, and Mr. Archibald Campbell, of Wishaw. From 1904 to 1908 Mr. Donald Campbell attended the Glasgow Veterinary College, where his academic distinctions included class medals in Pathology and Materia Medica.

After graduation in May, 1908, Mr. Campbell assisted his uncle in Rutherglen until the outbreak of the Great War in 1914, when he joined the Army Veterinary Corps. With the 9th Division he saw service in France, Belgium and Germany until he was demobilised in 1919. He was mentioned in despatches in 1917.

On the death of his uncle in 1921, Donald Campbell succeeded to the practice in Rutherglen, which now covered a considerable part of Lanarkshire and extended well into the neighbouring county of Renfrew. There is pathos in the knowledge that Principal Campbell had made his arrangements to retire from active practice at the end of the very week in which he passed away.

Early in his professional life Mr. Campbell joined the West of Scotland Division of the N.V.M.A., becoming its President in 1927-28 and serving as its Honorary Secretary during the period 1930-32. He was a member of the committee of that Division which, nearly 20 years ago, formulated the plan for the eradication of tuberculosis from the herds of cattle in these islands that, eventually, led to the creation of the State Veterinary Service in 1938. Mr. Campbell was also prominent in the affairs of the Scottish Branch, N.V.M.A., on the Council of which body he was for many years one of the six elected representatives. President of the Society of Veterinary Practitioners in 1936-37, he was elected President of the National Veterinary Medical Association for 1937-38, that momentous year in the history of the profession during which the solution of countless difficulties called for the utmost in wisdom, courage and tact from the officers of the Association. It was well that the N.V.M.A. then had Donald Campbell at the helm of its affairs.

Mr. Campbell was a deputy Port Inspector for Glasgow and, at one time, veterinary inspector for the Burgh of Rutherglen. Many Scottish veterinary practitioners there are who will long remember the magnificent, if unavailing, fight which was made by Donald Campbell, of Rutherglen, against that sub-section of the Milk and Dairies (Scotland) Act, 1914, which denied to a part-time veterinary inspector the liberty of practising his profession among those whom he was required officially to visit.

In 1939, Mr. Campbell was appointed an examiner in Veterinary Medicine to the Royal College of Veterinary Surgeons and, in 1941, he was made external examiner in Veterinary Science at the West of Scotland Agricultural College. On the death of Dr. A. W. Whitehouse in May, 1944, he was chosen to act as Interim-Principal of the Glasgow Veterinary College, which he did until the following July when he was appointed Principal. At the beginning of the current term Mr. Campbell had assumed as well the duties of Professor of Medicine and to the Glasgow Veterinary College it is tragedy indeed that its new Principal was spared so short a time in office. There were many ideas, especially in regard to clinical teaching, which the late Principal had that would have proved of inestimable benefit to his students. To give one example, there was the use of cinematograph films.

In his native Rutherglen, Mr. Campbell was a member of Munro Parish Church, a member of Masonic Lodge No. 347, and founder-member of the recently constituted Rotary Club.

So has passed on a great gentleman, intellectually gifted and of rare charm, whose courage, width of vision and wisdom were surpassed only by his sterling integrity. Of Donald Campbell it may well have been written *nihil tetigit quod non ornavit!*

To Mrs. Campbell and her two daughters will go the sympathy of the entire profession in their dire loss.

J. W. E.

Personal Tributes

Mr. Alex. Thomson, M.R.C.V.S. (Glasgow) writes:—

The sudden death of Donald Campbell has robbed the profession of one of that generation of members which has contributed much to its advancement. He will stand out in that generation as one who gave of his very best at all times to further the interests of his profession.

His outstanding leadership as President of the N.V.M.A., Examiner in Medicine to the R.C.V.S., Founder Member of Rutherglen Rotary Club and finally, Principal of Glasgow Veterinary College, will indicate to any who did not know him, something of the character of the man and the esteem in which he was held by his fellows. To those who knew him he was Donald Campbell; a man loved and respected, loved for himself, modest and approachable, a breadth of vision and integrity of purpose colouring his judgment at all times, which was always sure to be balanced, and delivered, particularly to his friends, with that pawky humour which served only to enhance his dignity.

The feeling of personal loss felt by his many friends is deepened by the knowledge that he was just about to be relieved from the arduous life of general practice and devote himself to his new sphere as Principal of the Glasgow Veterinary College, where his influence was already evident.

Mr. P. S. Hastie, M.R.C.V.S. (Ashford) sends the following tribute:

There are many who owe much to Donald Campbell. Our loss is grievous and great. How much greater is the loss of those students who, only so recently, had been privileged, in greater numbers than before, to study under him will never be realised. We, his extra-mural pupils, at least had that opportunity. Fate indeed has dealt Glasgow College an unkind blow in taking away so soon the one man who could be and was the inspiration of our college.

The profession has suffered deeply in the death of so illustrious and active a member, but the loss is ameliorated somewhat by the fact that Mr. Campbell, practitioner, gave a life's work to the profession. His work for Glasgow College had just begun and so the untimely passing of Mr. Campbell, Principal and Professor, is indeed grievous.

His wisdom and judgment in things veterinary, educationally, practically and politically, would have been freely and lovingly given to his *Alma Mater* as they had so been given to the profession and to those students who saw practice in Rutherglen.

I do not think we ever attempted to cultivate a nickname for our chief. His many and faithful clients simply called him "Donald" and from that we affectionately referred to him as "Unca Donald."

We had one of the finest practitioners as our tutor in Donald Campbell. Methodical, accurate and brilliant in his work; perhaps at his best with cattle, but a sound horse and small-animal practitioner as well. Kind, sympathetic and patient with animal and student alike—and both often gave him cause not to be; exacting in his work but impressing that habit by precept and example. We learned much: theory, practice, ethics and, perhaps most important of all, professional manners. He was gracious and courteous to all with whom he came in contact; quietly humorous, mild of temper. If his conversation, especially on professional topics, was somewhat slow, nevertheless you could be sure that what he said was not unthinkingly spoken and was as accurate as modern knowledge had made available. Equally so were his entertaining discourses on literature, art, theatre and politics.

His ardent support of Queen's Park Amateur F.C. was matched only by his dislike of the sea voyage to the Dublin examinations.

The farming community had at their service a capable practitioner and they respected and admired a gentleman in word, manner and deed in Donald Campbell, member of the veterinary profession, master of his chosen work.

We humbly and respectfully pay homage to our late guide, philosopher and friend. May we, your grateful students, prove in some small way worthy of your ever-honoured name.

The Funeral

The funeral took place on Monday, January 29th, 1945, at the Rutherglen Cemetery, where a very large number of people assembled to pay their last respects to their late friend. These included relatives, professional colleagues and friends.

After a service held at his residence, which was attended by relatives and a few personal friends, the committal service at the graveside was conducted by the Rev. J. Dick, of Munro Church, Rutherglen.

The chief mourners were: Mr. A. Campbell (brother), Mr. Allan (son-in-law), Mr. J. Moore (brother-in-law), and Mr. J. T. Cairns, M.R.C.V.S.

Amongst the numerous members of the profession present were: Colonel Sir Arthur Olver, C.B., C.M.G. (representing the Royal College of Veterinary Surgeons); Major D. S. Rabagliati (representing the National Veterinary Medical Association of Great Britain and Ireland); Professor G. F. Boddie (representing the Scottish Branch and the Scottish Metropolitan Division); Mr. R. J. Scott (representing Mr. A. Murdoch, Chairman of the Board of Governors of the Glasgow College); Professor W. Robb (the Vice-Principal of the College); Captain W. Watt (of the Board of Governors); Professor W. Mitchell (representing the Royal (Dick) Veterinary College); Mr. D. Brown (representing the Ayrshire Division); Mr. W. L. Weipers (representing the West of Scotland Division); Professor J. W. Emslie and Professor G. Dykes (Glasgow College staff and also representing Professor J. Russell Greig and Professor H. Burrow); Professor McCall (representing the West of Scotland College of Agriculture); Professor S. G. Abbott, Professor R. Aitken, Professor D. McLeod, Professor J. G. O'Sullivan, Professor A. Thomson, Dr. Knox, Messrs. J. S. McElhone, A. H. F. Robb and J. Robertson (Glasgow Veterinary College); Messrs. A. M. K. McLeod, M. H. W. Miller and Captain C. Tracy (representing the Ministry of Agriculture and Fisheries); Mr. J. F. Pollock (Town Clerk of Rutherglen and President of the Rutherglen Rotary Club); Mr. T. Jarrett (President, Students' Representative Council), and other members of the student body. Also present were Messrs. James Andrew, J. T. Cairns, A. C. Ford, J. W. McIntosh, W. Nairn, N. Nicholson, A. Pottie, James Steel, J. F. Taylor and J. M. Taylor. Amongst several beautiful wreaths sent were those from the R.C.V.S., the N.V.M.A. and the Scottish Branch.

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Brigadier A. J. Williams, D.S.O., F.R.C.V.S.

In our last issue we recorded with much regret the death, which occurred suddenly at Colwyn Bay on January 19th, 1945, of the above very distinguished retired officer of the Army Veterinary Service.

Brigadier Williams qualified at Edinburgh in May, 1898, and on July 6th, 1898, he was commissioned as a Lieutenant in the Army Veterinary Corps. He embarked for the South African campaign in 1899. He was appointed Senior Veterinary Officer, 6th Division, and was present with this Division at the fighting in connection with the Relief of Kimberley, and also at the Battles of Paardeberg and Driefontein.

He gained the Queen's Medal with four clasps and the King's Medal with two clasps.

In 1902 he sailed for India and remained there until 1905. During this period he served with the Tibet Expedition, 1904, and was awarded the Tibet Medal, 1903-04. In 1907 he was selected for service with the Egyptian Army in the Sudan.

He served with the Jebel Nyama expedition in Southern Kordofan in 1908 and was mentioned in Egyptian Army Orders in 1909. For this campaign he received the Egyptian Medal with clasp.

He then returned to the United Kingdom, and served in England till 1912, when he was again posted to India.

During this next tour in India he filled the posts of Senior Veterinary Officer, 9th Secunderabad Division, and Officer i/c, Army Veterinary School, Poona.

He proceeded to Mesopotamia as Assistant Director of Veterinary Services of the 15th Division in 1917, and was soon appointed Assistant Director of Veterinary Services, General Headquarters, Mesopotamian Expeditionary Force. He was mentioned in despatches in 1918 and 1919 and was awarded the D.S.O.

He proceeded home in 1919 and from 1921 to 1923 he was Assistant Director-General, War Office. From 1923 to 1924 he was Commandant, Royal Army Veterinary School. In 1924 he embarked for India and was appointed Assistant Director of Veterinary Services, Eastern Command. He later became D.D.V.S., Northern Command, from 1926 to 1928, when he was appointed Director of Veterinary Services in India. He retired in 1932.

Brigadier Williams possessed outstanding administrative and professional ability. He was an untiring worker in the cause of veterinary science and kept himself thoroughly up to date in the practical application of all its developments. He was a most capable surgeon and a great expert on the control of tropical diseases in animals.

Perhaps his greatest triumph was the elaboration of the intravenous injection of quinine acid hydrobromide for the treatment of equine piroplasmosis. His researches on this line of treatment justified his recommendation of utilising it on a large scale during the Mesopotamia campaign, and he obtained sanction to include an intravenous outfit with all units in the field. Prompt use of this specific remedy undoubtedly reduced mortality amongst horses engaged in this campaign.

Later, as Deputy Director of Veterinary Services, Northern Command, and Director of Veterinary Services in India, he took up with vigour the treatment of surra in both horses and camels with "Bayer 205."

Devoted to his profession and his Service he made a most valuable technical instructor to whom numerous people of a younger generation owe a debt of everlasting gratitude.

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GENERAL OBITUARY

Lieut.-Colonel W. Wragg

We deeply regret to read the announcement* of the death of Lieut.-Colonel W. Wragg which took place on the 23rd ult. in his 93rd year. He served in the 1st Life Guards from 1869 to 1904 and from 1914 to 1918 and was the oldest retired officer of the regiment. Colonel Wragg was well known to many members of the profession and we offer our sincere sympathy to our late Hon. Secretary and Treasurer, Capt. W. G. Wragg, and to Mrs. Wragg and their daughter in their loss.

* *Daily Telegraph*, January 27th, 1945.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Feb. 14th.—Meeting of the Editorial Committee, N.V.M.A., 36, Gordon Square, W.C.1, 2.30 p.m.

Feb. 16th.—Inaugural Meeting of the Society for General Microbiology, London School of Hygiene and Tropical Medicine, 2 p.m.

Feb. 21st.—Meeting of the British Society for Animal Production, London School of Hygiene and Tropical Medicine, 10 a.m. (Discussion on "Meat," following a short business meeting).

Feb. 21st.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, 1, Wimpole Street, W.1, 2.0 for 2.15 p.m.

Feb. 21st.—Annual General Meeting of the Lancashire Division, N.V.M.A., in Liverpool.

Feb. 24th.—Whole-day Conference of Nutrition Society, London School of Hygiene and Tropical Medicine, 11 a.m. Afternoon session, commencing at 2.15, will include papers on "Value of Wheat Offals for Milk Production," by Professor H. D. Kay, and on "Value of Wheat Offals for Pigs and Poultry," by Mr. E. T. Halnan.

Mar. 3rd.—Meeting of the Nutrition Society (Scottish Group), Royal (Dick) Veterinary College, Edinburgh, 10.30 a.m. (Subject: "Problems of Stock Feeding.")

April 1st.—R.C.V.S. Annual Fees due.

April 11th.—R.C.V.S. Committee Meetings.

April 12th.—R.C.V.S. Committee and Council Meetings.

May 8th.—R.C.V.S. Council Elections—last day for nominations.

May 22nd.—R.C.V.S. Council Election—Voting Papers issued.

May 29th.—R.C.V.S. Council Election—Voting Papers to be returned.

June 5th.—R.C.V.S. Annual General Meeting.

June 6th.—R.C.V.S. Committee and Council Meetings.

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R.C.V.S. Council Election, June, 1945

List of Candidates Nominated for Election up to Date

H. W. Dawes, West Bromwich.
R. E. Glover, Mill Hill.
W. R. McKinna, Huddersfield.
S. J. Motton, Penzance.
J. D. Peele, Durham.
T. Dalling, Weybridge.
W. M. Mitchell, Edinburgh.
Major J. J. Dunlop, Northampton.

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The Council of the Royal Society of Medicine has appointed a committee, under the chairmanship of Professor E. C. Dodds, to investigate the effects of oestrogens in cancer.

Incidence of Swine Fever

Enquiry was made recently of the Animal Health Division if any reason could be given for the apparently great increase in the outbreaks of swine fever throughout the country. The Chief Veterinary Officer has been good enough to allow us to publish the following note on the situation, which we do gladly, knowing that many practitioners have been anxious over the state of affairs in their own areas.

Outbreaks have increased considerably in comparison with the previous two or three years, but still fall short of 1940, which was the peak year of the century. Study of the incidence figures over a period of years shows that swine fever has always fluctuated, and curiously the fluctuation bears little or no relation to the pig population. This latter, of course, does not really furnish a reliable platform to work from, for it is more the number of herds or premises at a given time upon which estimates of incidence should be based, and of recent years there has been a big increase in the "small man" who is not on the census return list. Again, the relationship of virulence to diffusibility of outbreaks varies from time to time. One can have a herd wiped out by a virulent outbreak, and yet infection does not tend to spread to adjoining premises. The converse also occurs on other occasions.

It has been noted that the recent outbreaks are in much the same areas as those of 1939 and 1940—on the eastern side of England. The analysis of the facts does not lead one much further than the observation that a lively virus in a favourable environment means a lot of outbreaks.

Less importance is attached nowadays to the carrier animal, or the persistence of infection on premises, to account for outbreaks of disease. It is more likely that swine fever, like foot-and-mouth disease, is linked with the importation of meat foods from other countries, and that this is the main source from which fresh series of outbreaks arise.

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PERSONAL

Birth.—To Gertrude, wife of J. W. H. Holmes, on January 20th, 1945, a daughter—Janet Elizabeth; a sister for Ann and John.

Forthcoming Marriage.—Gates—Balls.—The engagement is announced between Harry Sladden Gates, M.R.C.V.S., elder son of the late Harold Gates and Mrs. Dawes, of 16, Cotham Vale, Bristol, and Iris Joy, only daughter of Leonard S. Balls, M.R.C.V.S., and Mrs. Balls, of Kenley Park House, Kenley, Surrey.

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ADDRESSES OF DISEASE-INFECTED PREMISES

Foot-and-Mouth Disease: 9, Bedfont Court Estate, Stanwell, Staines, Middlesex (Jan. 31st, 1945).

Swine Fever: Bathing Well, Manse Lane, Knaresborough, Yorks., W.R.; Meadow View, High Road, Byfleet, Weybridge, Surrey (Jan. 30th, 1945); Broad Cottage Farm, Surlingham, Norfolk; 29, Alwyn Road, Bilton, Rugby, Warwick; Slade Piggery, Cosheston, Nr. Pembroke (Jan. 31st, 1945); Railway Vioduct Garden, Staithes, Saltburn-by-the-Sea, Yorkshire; Park Farm, Womersley, Doncaster, Yorkshire; Gillshill Cottage, Gillshill Road, Hull; Clauchrie Farm, Kirkinner, Wigtownshire; King Street Piggery, Pembroke Dock, Pembrokeshire (Feb. 2nd, 1945); West End Farm, Garton, Driffield, Yorks.; Fen End Farm, Fen End, Honiley, Kenilworth, Warwick (Feb. 3rd, 1945); Inhurst Farm, Banghurst, Basingstoke, Hants; Rose Cottage, Southport Road, Lydiate, Lancs.; High Penhowe Farm, Burythorpe, Malton, Yorks.; No. 12 Small Holding, Duxbury, Chorley, Lancs.; No. 8 Cherry Tree Lane, Beverley, Yorks.; Stamp Hill Piggery, Addingham, Ilkley, Yorks.; Manor Farm, Norton Fitzwarren, Taunton, Somerset; St. Botolphs Place, Haverhill, Suffolk (Feb. 5th, 1945).

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VETERINARY EDUCATIONAL TRUST

The announcement in our issue of January 27th of the appointment of Bloodstock Research Fellows, representing as it does the inauguration of the programme of specialised research, affords an opportunity for the review of the activities of the Veterinary Educational Trust to date. Founded without capital or income at the end of 1942, an amount of nearly £200,000 has been received or is receivable under covenant. A year ago the Council decided to begin its work without waiting for the completion of the necessarily large capital fund required to give permanence to its programme, and has already awarded a number of scholarships and grants, research training scholarships and research fellowships. This it has achieved by encouraging donations for immediate use as well as those earmarked for capital growth. Details of these awards are given in the accompanying schedule.

Gradually the importance of the objects of the Trust in the interests of all owners of animals and of those associated directly or indirectly with the many branches of animal industry is being more widely appreciated. Red Cross and other war-time appeals not unnaturally postpone to some extent active development. Nevertheless, valuable interest is being secured through appropriate committees with the livestock world and with big industry, the leaders of which have expressed keen sympathy with the objects of the Trust. It is hoped to extend these contacts for mutual help to owners of small animals, poultry and birds. Already sympathetic discussions are taking place with representatives of the greyhound industry. The Duke of Beaufort has consented to act as Chairman and Sir George Courthorpe as Honorary Treasurer of the Livestock Industry Committee, which contains representatives of the R.A.S.E., the N.F.U., and the four National Breed Societies. Lord Teviot and Lord Perry have agreed to act as Chairman and Treasurer respectively of a Development Committee.

Early generous donations from veterinary organisations (the R.C.V.S., £1,000; the N.V.M.A., £2,500; the Central Veterinary Society, £250, etc.) have materially assisted and encouraged the Trustees and Council in their task. Many individual veterinary surgeons have contributed sums varying between £1 and £200, either by covenant or by single donation, and the late Mr. Geoffrey Livesey, M.R.C.V.S., a founder Trustee, made the Trust a residuary legatee under his will. Several veterinarians have also assisted the Trust by introducing it to some of their clients and by forwarding names of their more influential clients, with advice upon how these individuals might become more actively interested in the Trust.

Help from the profession in any or all of these ways is warmly welcomed and greatly appreciated, and will undoubtedly bring the ultimate success of the Trust nearer to fruition.

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Schedule of Awards

Bloodstock Research Fellowships.

J. Lochiel McGirr, M.R.C.V.S.—Research upon "The Specificity of P.P.D. Tuberculosis" at Weybridge.

Dr. J. Burkhardt, M.R.C.V.S.—Research upon "The Equine Heart and also Infertility" at Cambridge.

W. F. Davison, M.R.C.V.S.—Research upon "Equine Infertility" at Cambridge.

Miss A. Russell, M.R.C.V.S.—Research upon "Red Worm Infestation in Equines" at Weybridge.

Evans' Final Year Studentships.

Miss J. N. Milnes at Royal Veterinary College, London.

Mr. J. Burns at Veterinary College, Glasgow.

Mr. G. Duncan at Royal (Dick) Veterinary College, Edinburgh.

Mr. B. T. Farrelly at Veterinary College, Dublin.

Rank's Blue Cross and Spillers' Undergraduate Scholarships.

G. H. S. Ashworth, Morrisson's Academy, Crieff; Royal (Dick) Veterinary College, Edinburgh.

M. O'M. Briault, Blundell's School, Tiverton; Royal Veterinary College, London.

K. J. Hill, Liverpool Technical College; The Veterinary School, University of Liverpool.

S. A. Keeble, Oldham Municipal High School; The Veterinary School, University of Liverpool.

W. J. B. Morgan, The Ammon Valley County School; The Veterinary School, University of Liverpool.

I. C. Munro, Dornoch Academy; Royal (Dick) Veterinary College, Edinburgh.

J. Richardson, Rutlish Secondary School; Royal Veterinary College, London.

R. N. Smith, Bedford Modern School; Royal Veterinary College, London.

Awards deferred under the National Service Act.

P. H. Creyke, University, Leeds; Royal Veterinary College, London.

Michael Lawson, King's College, University of Durham; Royal (Dick) Veterinary College, Edinburgh.

L. N. Owen, Lancaster Royal Grammar School; The Veterinary School, University of Liverpool.

R. H. Penhale, Blundell's School, Tiverton; Royal Veterinary College, London.

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LEVERHULME RESEARCH FELLOWSHIPS, 1945

Application is invited for Fellowships and Grants in aid of research. The Fellowships and Grants are intended for senior workers who are prevented by routine duties or pressure of other work from carrying out research. They are limited to British-born subjects normally resident in Great Britain. In exceptional circumstances the Trustees may waive the condition as to residence. The Trustees are also prepared to consider applications from groups of workers engaged upon co-operative programmes of research, particularly from those engaged upon long-distance programmes or in institutions in which the normal facilities for research have been curtailed by the war. The duration of the awards will not normally extend over more than two years or less than three months and the amount will depend on the nature of the research and the circumstances of the applicant.

Forms of application may be obtained from the Secretary, Dr. L. Haden Guest, M.C., M.P., Leverhulme Research Fellowships, Unilever House, Blackfriars, E.C.4. Applications must be received on or before March 1st, 1945. Awards will be announced in July and will date from September 1st, 1945.

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DOG-BREEDING STANDARDS: A SALUTARY BROADCAST

The potential value of the appointment of a veterinary surgeon as a factor in the formation in the public mind of sound views on animal health is exemplified by the recent Home Service broadcast

reproduced in *The Listener* of February 1st, in which a forceful plea was made for the establishment of genetically sane standards of dog breeding. This is an extension into the canine field following on a number of broadcasts on farm topics during the past year, both in the Home Service programme, and on short waves to some of our Dominions and Colonies, that judging from a large correspondence ensuing have aroused considerable interest and approval. The "strange ideas" are pilloried of experts who, for example, have reduced to a "furtive looking affair" the wide-browed roomy skull of the old-fashioned, intelligent collie, immobilised the joints of the breeds meant to "go to ground," turned our gun dog stocks neurotic and produced strains that require repeated Caesarian sections for the birth of puppies. It is urged that the authorities of the dog world, the veterinary profession and experts in the science of genetics should get together to evolve standards conforming to the well-being of the canine race. To this end lessons should be learned more readily from the measures taken by the breeders of other species, notably cattle and horses, to eradicate unwanted or inherited points or defects: there is a great need for a system of recording the histories of litters and of canine breeding stock, and the vast amount of practical knowledge now available should be put at the disposal of breeders by scientific workers. In the absence of these safeguards, the man in the street who goes to a show and purchases his foundation stock on the strength of prizes and championships is likely to be building on sand. The time has come for judging less on a basis of fashionable types of beauty and more on a basis of recorded science.

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WELSH DEMAND FOR A VETERINARY COLLEGE

At a conference of representatives of Welsh County Agricultural Committees and Borough Councils, held in Shrewsbury, Ald. R. S. Wade (representing Pembrokeshire, the county which convened the meeting) proposed the following resolution: "That in view of the requirements of the Welsh agricultural industry and of the expressed opinion of many public bodies and councils, this conference is of the opinion that facilities for the training of veterinary surgeons should be provided in Wales."

A committee was set up to take such steps as may be necessary to achieve this desired end: Professor Share Jones, Liverpool University; Ald. J. Griffiths, Cardiff; Ald. T. Thomas, Carmarthenshire; Ald. R. S. Wade, Pembrokeshire; Ald. J. C. Davies, Denbighshire; Ald. Gethin Davies, Denbighshire; Ald. W. C. Black, Montgomeryshire; Dr. Hadyn Williams, Flintshire; Ald. J. Dix, Glamorganshire; and one representative for Monmouthshire.

The Committee was empowered to ask for the help of anyone it might think fit.

Another resolution moved by Ald. Wade was "That this conference feels it highly desirable that the University of Wales should provide the faculty." This was left over for the appointed committee to deal with.

Emeritus Professor J. Share Jones (Professor of Veterinary Science, Liverpool University), who was appointed chairman, emphasised the importance of such a faculty for the training and instruction, actually in Wales itself, of students intending to become veterinary surgeons.

It would also greatly assist the general science of medicine, and he wanted Wales to make such a contribution.

The faculty that they had in mind would take a parental care of all these things, and so, with science, assist the community.

Professor Share Jones said that he modelled his ideas on the progressive country of Switzerland, a country of which he knew a great deal. It was a small nation like Wales, yet with even greater difficulties to face. But that country had veterinary faculties, and Wales must have one. They were only asking for what England and Scotland had.

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MINISTRY OF AGRICULTURE NEWS SERVICE

Fresh Air For Calves.—Calves would be all the stronger and healthier if they could be reared on an outdoor rather than an indoor system. On many farms this would be difficult for it would mean the special provision of dry, sheltered paddocks or yards with a roofed-off section for feeding or shelter. Abundant exercise and plenty of fresh air, however, can be given to young calves and are as important as good feeding, especially if the calves are intended for dairy herd replacements. Calves should have access to the open air on all but the wettest and coldest days, but the greatest care must be taken to shelter them from cold winds and draughts.

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A Case of Foxglove Poisoning.—Since early times the foxglove has been recognised as possessing markedly poisonous properties, so much so that an old name for the plant was Dead Man's Bells! Although stock rarely eat this plant it may be present in rough meadow hay and in 1906 *The Veterinary Record* mentioned a case in which two cows and a horse became ill after eating hay containing dry foxgloves. Now, from Dorset comes another case of foxglove poisoning in which one horse died, one became very ill and the milk yield of a herd of 40 dairy cows was considerably reduced.

It appears that a piece of derelict land on the farm where foxgloves grew was re-seeded. The plants made their appearance in the new grass. When grazing the field all stock avoided the foxgloves, but part of the herbage was made into hay with dire results.

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World Agricultural Production Increased.—The United States Office of Foreign Agricultural Relations reports that despite shortages of fertilisers, equipment and man-power, agricultural production over the world as a whole has increased slightly during the war years. A survey of output in 30 countries, having 60 per cent. of the world's population, showed a rise in 1942 and 1943 of 7 per cent. on pre-war levels, measured in calories. The estimated scale of expansion was about 30 per cent. in North America, 17 per cent. in South America, 3 per cent. in Southern and Eastern Asia and 1 per cent. in Oceania and South Africa. Production fell by 5 per cent., it is calculated, in Western Europe and North Africa and by 5 per cent. in the Middle East.

While no estimates were available for the battle areas of Russia, China, Malaya and the East Indies, it is thought that production in those areas has declined considerably. The world increase, in fact, was probably no greater than the increase in population that it had to meet.

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Red Polls and Longevity.—Over 140 years ago the skilful mating of the old Norfolk and Suffolk Red Poll produced that excellent type of animal now known as the Red Poll, a breed that combines the red colour and beef producing quality of the Norfolk with the milking capacity of the Suffolk. Red Polls are also noted for their longevity. Captain Alan Richardson, Lechdale, Wilts., has a Gloucestershire Red Poll cow that is 13 years old, has bred ten calves and has produced nearly 50 tons of milk and is still giving 7½ gallons a day.

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Better Poultry.—The Government has announced its intention of encouraging an expansion of poultry and egg production to the fullest extent permitted by the supplies of available feeding-stuffs. Mr. R. S. Hudson, Minister of Agriculture, has now stated in the House of Commons that to prepare for this expansion steps are to be taken to encourage and improve the production of sound breeding stock. He proposes to set up immediately a Poultry (Stock Improvement) Advisory Committee; and as from April 1st, 1945, the Ministry of Agriculture will assume direct responsibility for the accreditation schemes for poultry breeders and hatcheries, a responsibility at present borne by County Councils.

The Advisory Committee will keep under review the position of the stock producing and distribution section of the poultry industry. It will advise on existing measures designed to encourage the production of high quality breeding stock and suggest any further steps considered desirable to that end. The Ministry of Agriculture will also seek the advice of the Committee on the accreditation of poultry breeders and hatcheries and on any further schemes of assistance for them.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

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THE LOVEDAY REPORT ON VETERINARY EDUCATION

Sir,—The Loveday Committee is to be complimented on its report relative to veterinary education in Great Britain, extracts of which have been published in *The Veterinary Record* and recently received by me. The Committee's review of the veterinary position in Great Britain is informative, its survey of facilities for education and training interesting and constructive, and its recommendations for reform and extension of the powers of the Council are definitely challenging to all who have the welfare and the progress of the veterinary profession at heart.

Prominence has been given in the Loveday Report to the desirability of further participation by the universities of Great Britain in veterinary education, and as this seems to have given rise to some controversy the following information about the Sydney University Veterinary

School might be of interest to your readers as it has a direct bearing on some of the points at issue. This school was established in 1909 by Government appropriation and has been assisted in its development by numerous bequests and donations made by institutions and private individuals interested in the promotion and application of veterinary knowledge. It is an integral part of the University of Sydney under the control of the Faculty of Veterinary Science of equal status to other Faculties in the University such as Medicine, Science and Agriculture, and its main buildings are within the precincts of the University grounds: The veterinary students enjoy all the rights and amenities of university undergraduates, and in close association with students of other faculties they have equal opportunities to widen their mental horizon and cultural outlook. In addition to occupying prominent places in the university pass lists, our students play a full part in various undergraduate activities and have filled with distinction high offices. The curriculum extends over five years and while the fundamental sciences and pre-clinical studies are taught by other faculties, all education and training in veterinary subjects are under the control of the Faculty of Veterinary Science and are carried out in the School and its Hospital, while practical instruction in Animal Husbandry is provided for at the McGarvie-Smith Farm of 400 acres which adjoins the McMaster Animal Experimental Station (C.S.I.R.) of 800 acres. This farm is well equipped and has accommodation for students to reside there for specified periods, which in the final years are lengthy. Further, within the grounds of the Veterinary School is the McMaster Animal Health Laboratory (C.S.I.R.) which affords additional facilities for training in the diagnosis and control of disease. Professional examinations are conducted by the Faculty, the examiners being the lecturer in charge of the subject and an outside veterinarian. Thus, the Sydney Veterinary School aims not only to train sound practitioners but also to equip graduates to meet the ever increasing demand for scientific investigation and direction in the many avenues that have opened up for veterinary service ; and it must be recognised that the development of the School has been materially assisted and public appreciation of the profession greatly enhanced by the establishment of the School within the University.

To students who have fulfilled all requirements the University of Sydney, on the recommendation of the Faculty, grants the degree of Bachelor of Veterinary Science. The designation " Veterinary Science " has been adopted in preference to " Veterinary Surgery " or " Veterinary Medicine" as it properly indicates the extensive study and training required for graduation, and carries an implied qualification for many positions veterinarians are now called upon to fill. Holders of the degree are entitled to registration under the Veterinary Surgeons Acts of the different States in the Commonwealth of Australia. Incidentally it might be mentioned that holders of the diploma of the Royal College of Veterinary Surgeons are likewise entitled to registration, although the Royal College does not recognise our University degree.

My close contact as a student at the Royal (Dick) Veterinary College with other students who were taking out Medicine in the University of Edinburgh, and the experience gained over a period of 30 years in establishing the Sydney Veterinary School, lead me to support strongly the advocacy of the Loveday Committee for further participation by the universities in veterinary education. As indicated in its report there are many difficulties to be overcome, but to my mind none is insuperable provided the sincere desire of all interested is to advance the status and increase the usefulness of the veterinary profession. During the past century the Council of the Royal College has done signal service in advancing the welfare of the profession which we acknowledge with deep gratitude, but the question as to whether it can with its present constitution fully and effectively meet the requirements of the present century must exercise the minds of all interested in veterinary progress. The proposed extension of power to bring it into line with the General Medical Council has much in its favour, and in this connection it is suggested that some consideration might be given to the desirability of amplifying the powers to extend throughout the Empire with the object of attaining effective unification of British veterinary endeavour.

Yours faithfully,

J. D. Stewart,
Emeritus Professor of Veterinary Science,
The University of Sydney.

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TUBERCULOSIS OF THE GENITALIA OF BOVINES

Sir,—I have read with great interest the article and letters appearing in *The Veterinary Record* on this subject from Messrs. J. Berger and D. N. Spriggs.

During the past year I have encountered two such cases in the same herd. The first was an eight-year-old Friesian cow, which had been treated for some months previous to my seeing her, for infertility associated with a purulent uterine discharge. Rectal examination, aided by epidural anaesthesia to overcome excessive irritability of the rectum, revealed what appeared to be a fibrosis of the uterine body. Discharge was not copious, but a specimen was obtained, and on microscopic examination found to be teeming with tubercle bacilli. *Post-mortem* examination showed tuberculosis affecting bronchial and mediastinal lymph glands, substance of lungs and substance of uterus.

The second case was a three-quartered Friesian cow which developed a copious purulent discharge from the uterus a fortnight before due calving date. She was very distended and uncomfortable and appeared to be affected with hydrops amnii. It was decided to terminate the pregnancy and stilboestrol dipropionate 45 mgm. was injected intramuscularly. Forty-eight hours later she aborted a very small but live calf, which was destroyed. She cleansed, without assistance, in a few days and came into two gallons of milk. In the above circumstances, and as she had chronic mastitis in all four quarters, this small yield was not surprising.

I had unwisely assumed that the uterus was infected with *corynebacterium pyogenes,* and when told, a fortnight later, that she was still discharging, examined her per rectum with a view to irrigation with Lugol's solution. As in the previous case, I encountered a pronounced induration of the body of the uterus. Microscopic examination of discharge showed large quantities of tubercle bacilli. Typical cell-grouping and acid-fast bacilli were demonstrated also in the milk from one quarter. *Post-mortem* findings consisted of tuberculous lesions in both lungs, on pleura (localised), in retropharyngeal, submaxillary, bronchial, mediastinal, hepatic and iliac glands, and in the substance of liver, uterus and udder.

I have recorded these two cases because of the clinical finding common to both of them, namely, an indurated area in the body of the uterus. It would be interesting to know if others have found a similar condition. No adhesions in ovarian bursae were observed in either case.

There can be no doubt that such cases of open tuberculosis are a potent source of infection in dairy herds, and I strongly support Mr. Berger's suggestion that the Tuberculosis Order be reviewed to include them.

Yours faithfully,

28, Stoke Road, Guildford. E. P. Barrett.
January 30th, 1945.

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THE DANGER OF RABIES

Sir,—The Editorial on the subject of rabies in your issue January 20th has prompted me to suggest that the N.V.M.A. would be doing a public service if its influence could be used to have the article, reprinted from the *Lancet,* published in all the daily newspapers and also broadcast by the B.B.C.

My experience in practice, and later in the Service, has shown me that the public is entirely ignorant of the existence of rabies, of its danger to human life, and of the fact that, due to the quarantine regulations, this country is kept free from rabies.

Last summer, at the base in which I was serving, I met several dogs which had made trips to the Normandy beaches, where, I was told proudly, they had gone ashore and engaged in victorious fights with the local French dogs! The men on the craft concerned were completely unaware that they were doing anything unlawful or wrong in any way. My attempts to enlighten them were greeted with ridicule.

Yours faithfully,

Lucy R. Robinson,
M.R.C.V.S., W.R.N.S.

G.P.O. Box 30, Poole, Dorset.
January 27th, 1945.

[The Editorial Committee already has adopted measures designed to secure such publicity as our correspondent desires.—*Editor.*]

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THE " RADIO VET."

Sir,—My good friend, Mr. Steele-Bodger, once reproved me, quite correctly, for using the term " vet." We all hate contractions, but we must needs adopt them since life is brief! As, however, the B.B.C.—who do not receive sufficient recognition of their efforts to raise the standard of English—now use the term " Radio Vet.", may a mere layman do so also?

The R.S.P.C.A. believes there is a great need for the public to be made what might be termed " veterinary conscious " and we think the appointment of a Radio Vet. is an excellent step in the right direction. May the Society congratulate this Vet., whoever he may be, and those responsible for his appointment?

Yours faithfully,

A. W. Moss,
Assistant Secretary.

Royal Society for the Prevention of Cruelty to Animals,
105, Jermyn Street, London, S.W.1.
January 31st, 1945.